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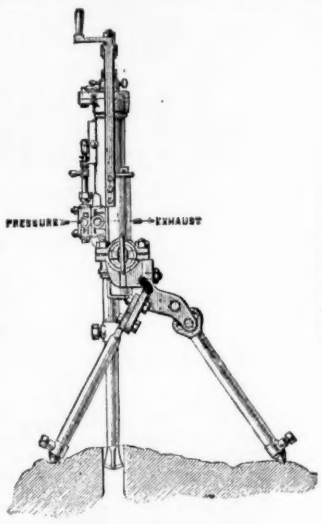

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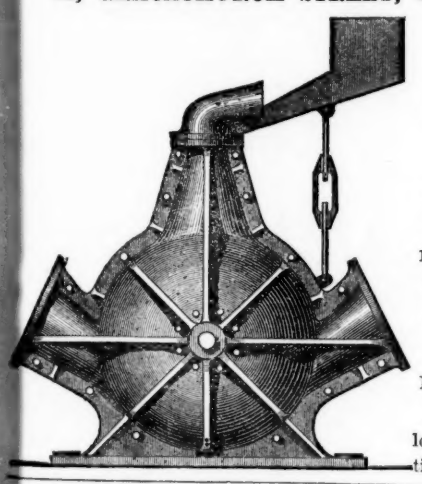

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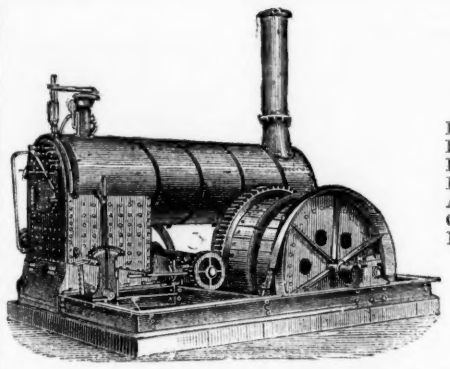

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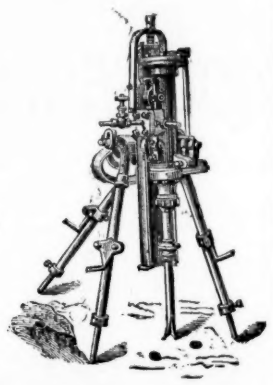

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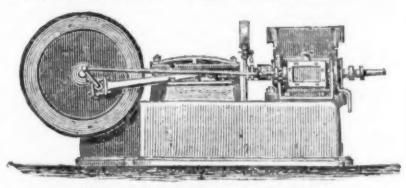

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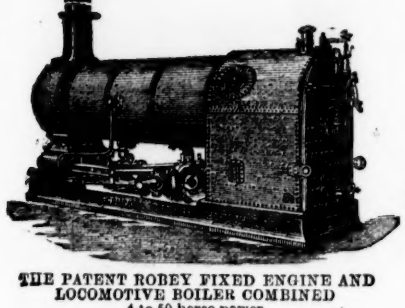

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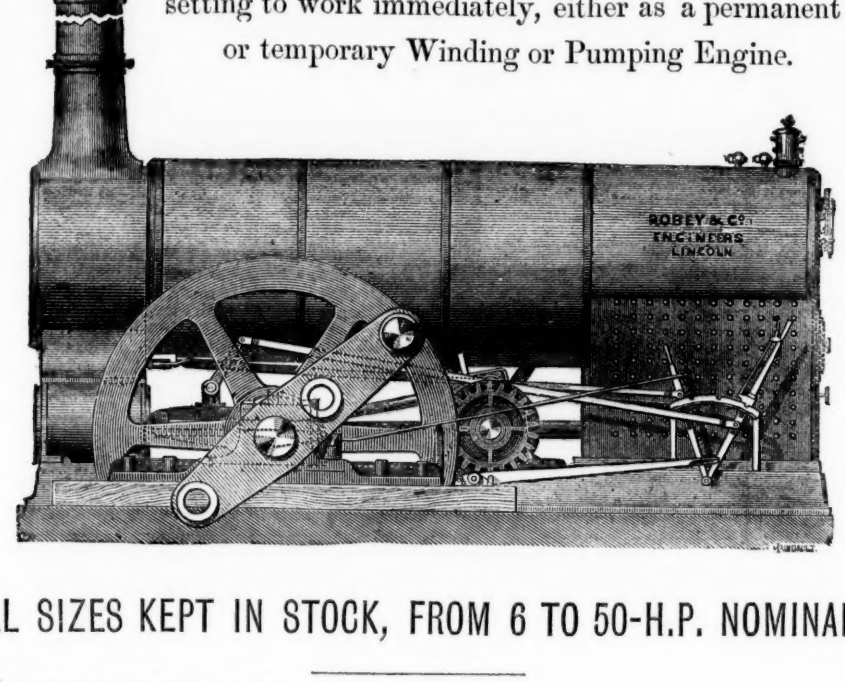

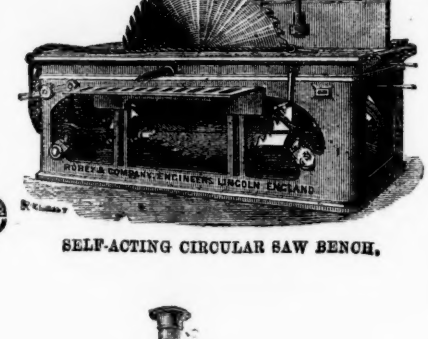

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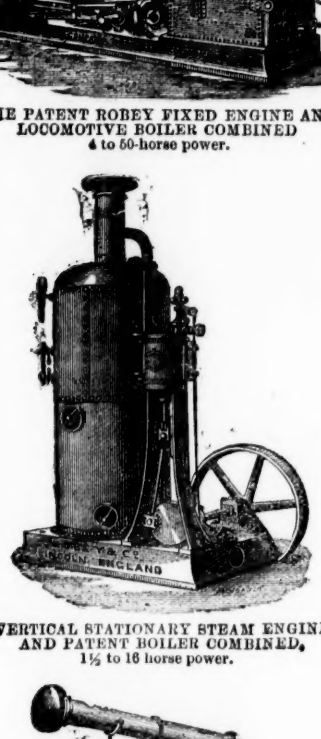

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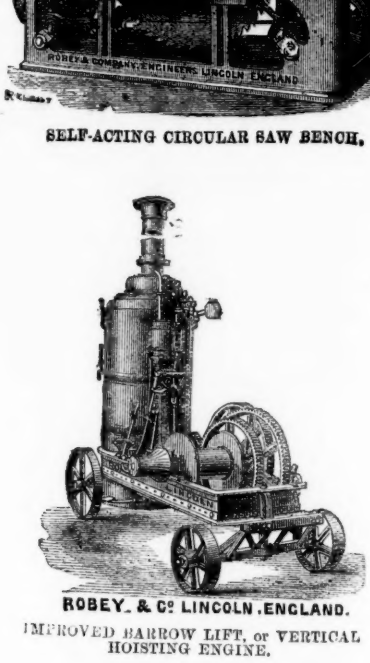

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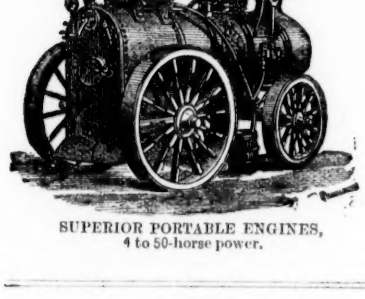

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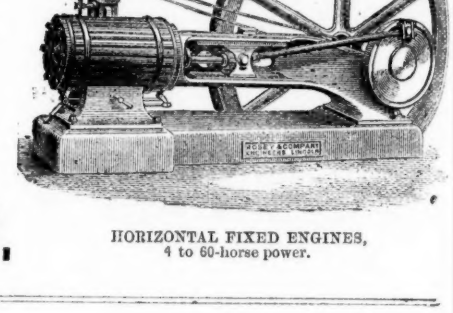

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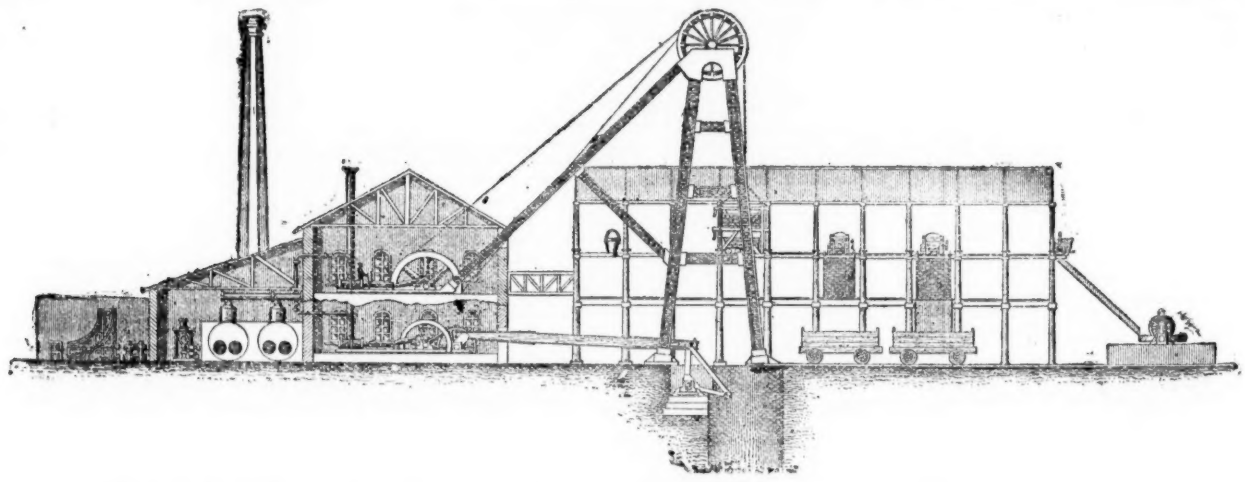

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Original Correspondence.

COLLIERY EXPLOSIONS—SOURCE OF FIRE-DAMP.

SIR,—I will thank you to publish this communication, as the discussion of the source of fire-damp may prove a great step towards the solution of a difficult question. We have been in the habit of accepting the sudden occurrence of large volumes of fire-damp as a fact beyond which little or nothing was known; an explosion may or may not have followed, and we have resumed our work as a matter of course, hoping for the best on the next occasion. But I think the darkness of our ignorance is about to pass away; for it is beyond all question that gases evolving in confinement can generate such force as shall drive off their latent heat, after which on sudden release they vapourise, liquify, or solidify, according to intensity of pressure until recently it was only known of hydrogen that it had remained gaseous under the pressure of 8000 atmospheres, but since has advanced beyond that

I will now ask my readers to bear to bear in mind that a vapour is only a condensed gas, and a gas only an attenuated vapour. For instance, steam close to its escape from the safety-valve is a gas, while 2 or 3 ft. away it is a vapour. Air escaping from the valves of an engine acts in the same way—*i.e.*, it remains air while under pressure, but becomes vapour on being set free, though the pressure be only 40 lbs. on the square inch. The visible thickening does not occur during the pressure, but on the release; this is important to observe. Now hydrogen under 280 atmospheres, oxygen under 300 atmospheres, nitrogen under 200 atmospheres, and carbonic acid under 36 atmospheres remain gaseous so long as the pressure is maintained; but the instant it relaxes the change sets in and continues until those condensed gases have time to regain their latent heat and expand to their normal state. I am unable to say at what pressure carburetted hydrogen will vapourise on the pressure being eased; but that it will do so, and that the collier while hewing coal eases the pressure is as certain as that I am trying to explain the matter. Mists have been seen about where gas has been escaping, and have been mistaken for "little common fog." I will venture to say that supposed fog was condensed carburetted hydrogen regaining its latent heat preparatory to expansion and formation of fire-damp.

Now, as to the origin of the requisite pressure, there are two forms at work in a coal seam—that produced by gases themselves as they evolve, and the superincumbent strata. I have not all the information I should like, but carbonic acid while evolving will burst an iron shell, and I am inclined to think that hydrogen, oxygen, and nitrogen will burst a thicker shell. As to the pressure of strata overhead, I have seen 14 ft. of solid masonry crumpled up by it as though it were paper.

With this information before me, and having lived in earthquake lands, I consider the bumps and thumps heard in fiery seams to correspond to the explosions heard immediately preceding the shake. In fact, the gases evolve, the strata heads them back and confines them, the collier lightens the pressure, then comes the minature earthquake as forewarning of the storm, out comes the little mist, which expands—there is a naked light, and all is over. There is nothing for it but to tap ahead by boring. I shall be much indebted to anyone who having the opportunity will test the temperature of "blowers" at their orifice, and kindly let me know the result, and also that of the mine. J. D. SHAKESPEAR.

Great George-street, S.W., Jan. 17.

EXPLOSIONS IN COLLIERIES.

SIR,—Explosions in collieries are, in the opinion of the writer, preventible to a very large extent; the exceptions would narrow themselves down to cases where men would deliberately take down matches and use them, or wilfully damage their lamps. The use of gunpowder is no doubt the main cause of the terrible disasters. So long as its use is continued explosions and loss of large numbers of lives will be reported from time to time. Many deaths from falls of roof may fairly be laid to its charge. Another source of explosions is accounted for by the objectionable system of lighting collieries, such as with naked lights, mixed safety and open lamps, and imperfect safety lamps. The only remedy that will be effectual is to abolish the use of powder, and adopt as a means of lighting the collieries lamps that are known to be the safest in principle and practice. It is not for the writer to name the special kind of lamp, but merely suggest what, in his opinion, would fulfil the qualification of safety, and name advantages that would certainly follow the abolition of gundowder. So long as powder is used there is little, if any, chance of a substitute being fouud that would do its work without causing an ignition of gas or of being able to supercede the more ancient and common use of powder. Were it abolished, in all probability mechanical means would be found to supply its place. By its discontinuance there would no doubt be a restriction in the output of coal, and prevent the men from winning so much coal per day as at present; but this in itself would not materially interfere with the welfare of the coal trade; for if the output is restricted the men would win less coal, the commodity would become more valuable, the price to the consumer would be advanced, wages would be increased; such increased cost would have to be borne by the consumer. If the advantages are fairly weighed it will be found that collieries would be worked more regularly, a great diminution in the annual list of disasters and register of deaths arising from them. A saving would he effected of the vast amount of expense incurred when an explosion takes place, the investigation and recovery of bodies, repairs to the pits, together with the requirements of the large subscriptions from the public, would be dispensed with, and last but not least there would be an end of the suffering experienced by the friends and relations of men who meet with such terrible deaths when an explosion occurs. It is well known there are numbers of mining engineers and colliery managers who have dispensed with the use of powder, and are still able to hold their own against those working similar coal with the aid of powder. The writer has met with many colliery managers who would willingly give up blasting if those they were competing with would do the same.

In other cases the objection on the part of the men is the cause of its abolition being prevented, and to meet this managers of collieries require some authority to place before the men to show that its abolition is compulsory. It is common enough to hear the remark "Do away with blasting and one-half the pits would be shut up." But after an explosion, and blasting is prohibited, pits do not cease working, for some way is found to continue work under the new arrangement. Much more might be said on the question, reference to the opinion of others made, and many examples given, but for trespassing on your valuable space.

With respect to the safe lighting of collieries, to carry it out effectually the man who is responsible for attending to the lamp should be a better stamp of man than is generally found in a lamp cabin. A better system or inspecting, cleaning, trimming, and locking lamps is required. The common and pernicious system of allowing men to have possession of their lamps when not in use should be prevented. Open lights of every description should be prohibited beyond a certain point from the downcast shaft. The main features of lamps to be used are the locking should be so as to prevent anyone from withdrawing a flame when put together, and as an extra precaution a seal or check, placed so as to connect the top and bottom, that if it were tampered with would be instantly detected when inspected. The light should be as brilliant as it is possible to produce, but the size of the flame must be kept within certain dimensions. The lamp and glass chamber should be sufficiently strong to withstand rough usage they are subjected to, and together with the flame so arranged that if accidentally dropped, or if it received a severe blow, the concussion should extinguish the flame before it could be exposed. The top portion of the lamp should be so constructed that it would in effect be a double lamp; and to provide for any defect in the outer or inner portion, so that for the lamp to be dangerous a defect would have to exist in both, a condition that would not readily occur. The lamp should also have the qualification of becoming immediately extinguished in an explosive atmosphere, or if subjected to a velocity of explosive gas of 6 ft. per second. The suggestions made are not theoretical, but have been adopted in several large collieries that are well known to be fiery, with the result that although during the past few years most alarming incidents had taken place no casualty has occurred.

In conclusion, if one quarter of the time spent and trouble taken in solving questions of far less importance and effecting much smaller interests were devoted to a solution of the question, "How best to prevent explosion?" much good would result, particularly if the laws of nature were taken as the ground to build upon.

Jan. 17. PREVENTION.

COLLIERY EXPLOSIONS, AND THEIR PREVENTION.

SIR,—One after another colliery explosions follow each other in such quick succession, and are so soon in effect forgotten by those in command, that to us they appear to be treated either as a matter of necessity, or to be entirely beyond their controul, as no energetic and effective steps are taken to reduce their frequency or virulence beyond that of more closely adhering to the old treacherous system that has destroyed so many lives. After careful consideration we cannot but regard the present system of coal mining as fundamentally erroneous, and until a complete revolution is effected in the system no confidence can be placed in the safety of the collier. To effect this change some other means of safety than the safety lamp must be introduced. All our experience goes to prove that to trust for safety to the safety lamp is a gigantic error, and every so-called improvement made upon it has only tended to refine its treachery and make its deceptions more fatal. By its means the lives of hundreds of people are placed in the hands of those who are utterly untrustworthy, and who through ignorance or thoughtlessness might destroy the whole. A strike of a lucifer match, a fracture of the lamp, a spark from the point of the mandril in the act of coal cutting, might be the cause of a catastrophe we shudder to contemplate. No argument is needed to prove that a state of things so hazardous should not be tolerated when other means may be devised and easily and economically carried out. Such means will be found in a thoroughly improved system of ventilation. If the atmosphere of the mine is well diluted with pure air an explosion is impossible, and this is a condition by no means difficult to attain. If the ventilation is carried on by means of machinery, and one is found to be insufficient for the purpose, let more be used—a machine will cost less than an explosion. The air must be expelled from the mine before it has become so highly charged with gas as to be inflamable. This will be found to be far preferable to tampering with a dangerous compound, as is now usually done. In some of our best managed mines one machine has to ventilate several miles of levels, stalls, headings, &c., and the current is divided into so many branches and ramifications as to become so feeble that it is hardly perceptible, so that through a great proportion of its passage it is so highly charged with gas as to be highly explosive. Let the managers of our collieries take these facts into consideration, and if they are fairly and properly dealt with colliery explosions will soon become things only of the past, and the wonder will be that our scientific men and engineers have allowed the evil to rage so long.—*Jan.* 8. TAFFY.

THE TIN SMELTERS' PROFITS.

SIR,—There is no subject so pleasing to certain mine adventurers as the alleged monopoly carried on by the smelters of tin in Cornwall. All the evils to which mining is subject seems to them to be embodied in the smelting of tin and the profits derived therefrom. These carpers never examine a cost-book with a view to investigation, nor refer to the monopoly of coal and other concurrent drawbacks to economy, nor yet to the weighty sayings often uttered at the meetings of the Mining Institute. In November, 1879, it will be found by referring to your Journal that Dr. Le Neve Foster thus expressed himself:—"The ideal mine of the future will be one where the men have no climbing whatever, but are raised and lowered by machinery."

Another speaker, Capt. A. James, said that machinery in Cornwall was not what it ought to be. Bad shafts, defective pitwork, defective boilers, inferior pumping power, all cried aloud for reform, especially the 30,000*l.* yearly which ran to waste in the Red River.

On the matter of economy it is asserted, and I believe with correctness, that were the mines well supplied with new and perfect machinery in substitution of that now in existence, with coals for working the same at first hand, and the workmens' labour utilised as named by Dr. Foster, mines that now require 50*l.* a ton for black tin to pay costs would pay handsome dividends if they only obtained 40*l.* per ton.

These matters outweigh the question of the mode of selling tin, which after all is for the most part regulated by supply and demand, except when interfered with by the gambling in the metal on the London market.

I will leave the question of the economic working of mines in other hands, and will simply briefly review two periods representing the past and present margins between the seller and the buyer in the sale and purchase of tin ores. The margin for some time past has averaged about 7*l.* per ton; it is now about 6*l.* per ton. Out of this margin the smelter has to pay the cost of converting the tin ore into metal, and all other charges incident to the smelting business. I assume that the average margin of 7*l.* per ton, which has so long existed, is all that is required for the maintenance of proper profits in the smelting business. The smelters, without exception (Penpoll Company included), have bought the tin ores subject to this margin.

In contrast with this, the margin in November, 1879, between seller and buyer was 13*l.* 17s. 6d. per ton, or an excess, as compared with the present margin, of 6*l.* 17s. 6d. per ton. "The production of tin at this period was about 1200 tons a month, or 14,400 tons for the year, which at 6*l.* 17s. 6d. amounts to the large sum of 99,060*l.* taken from the miners in 12 months, at that time in excess of what is now deemed sufficient." In November, 1879, the Journal refers to the margin of 13*l.* 17s. 6d. in the words uttered by Capt. Teague at a meeting of the Miners' Institute. On that occasion, in condemnation of this large margin, that 1 ton of black tin ore, yielding 13½ cwts. of metal, was sold by the miner to the smelter for the sum of 50*l.* 5s. 0d., whilst the said metal (13½ cwt.) was worth in the London market 64*l.* 2s. 6d. per ton, showing a margin of 13*l.* 17s. 6d. on each ton of black tin ore sold by the miner. It will be useless in the face of these facts to deny that smelting has not been very profitable; but the same may be said of other businesses in the county and out of it; and I have yet to learn why a business, honourably conducted, buying in the cheapest and selling in the dearest market, should not be entitled to the profits thus realised.

It is manifest that whatever profits have been made by smelters have been made with the tacit consent both of the adventurers in the mines and the lords of the soil. If the lords and adventures had chosen at any period of the past to have sought further competition they might unitedly have assembled in public and ventilated their grievances, with a view to increased competition. There have been meetings of certain sections of mine managers, but nothing tangible has ever been laid before the public bearing on the question of tin.

If the past system of selling tin has been evil, that evil has now been welded together with another form of evil, never contemplated in the true interests of mining. Capt. Teague is now both seller and buyer, and has at his command about two-fifths of the entire produce of the county. In November, 1879, he said the mode of selling the tin produce was objectionable, and that the mine adventurers ought to know when alterations in the standards were to take place, and the reason for so doing. I quote his own words, and unless his views are now modified it would be a boon to have his reasons for the alterations in prices of tin, and at the same time a confirmation that the margin of 7*l.* or 6*l.* per ton, which he now accepts between seller and buyer, is a just one.

Subject to such a confirmation, the future of the tin smelting business would be comprehended by the public. The need of selling by public ticket is admitted on all hands, provided that the lords insist on all the tin produced in the county being sold after this fashion; but while some are willing and others are unwilling to agree, I feel convinced that private sales, subject to the present margin, are more desirable than public ticket.

Having set forth in simple form the broad facts indicated in two periods of startling disparity, I am, with the knowledge in my possession, in duty bound to say that the severe margin of 13*l.* 17s. 6d. barely covered the risk consequent on the gambling in the metal on the London market. There have been in recent years brokers in London who have been as heartless as the cause of the miner was heartrending in the periods of depression; and to this cause was mainly due the deepened and perpetuated depression that so long hung over Cornwall's staple produce. It was not a question of large stocks only, but of gambling in the same to buy cheap and to sell dear.

Further, there have been little smelters and big smelters. The former did incalculable harm in underselling their metal to the very brokers who had no interest in supporting prices. Financial need forced them to do this, but in so doing they violated the most sacred promises not to sell below the price agreed to with their fellow-smelters. I may add that after an agreement was come to by the smelters in Parliament assembled one of the smaller fry, now dead, through a medium metal broker offered by wire within 24 hours a large lot below the agreed quotation, which was accepted. Then followed another, and then another, till at last the truth came out, and word was sent to the little smelter that the residue, instead of going to Liverpool might be brought hot from the smelting house to their works. This party had not capital sufficient to hold any quantity of the metallic tin, and when borrowing was no longer possible he had to submit to the humiliation I have described.

Tin smelting with a small capital is highly injurious to the mining interest. Without fully agreeing in the statement made by "Omnibus Unus," in the Journal of Dec. 11, that 500,000*l.* is needful, I may safely say that a capital of 10,000*l.* is useless. It represents a power to hold about 110 tons of metal at the present price, and as the Penpoll purchases more than 10,000*l.* worth there is virtually nothing to support the market with on such a capital. When stocks of tin increase it is needful in the interest of the maintenance of the price that capital should be at hand to hold. If stocks of tin increase the margin will be widened, the price of tin ores will drop, and all owing to one fact—the absence of capital (save with a few firms), which compels the weaklings to play into the brokers' hands.

This London speculation has been caressed—yea, even petted. The day will come when this well intentioned but injudicious support will recoil in wide spread evil. The great smelters have acted honourably, particularly in never selling the mine shares they held prior to the price of tin drooping, and never buying when tin was on the ascendant, except for investment. This line of conduct is well worthy of imitation.

In conclusion, I may revert to Dr. Foster's synopsis, showing the variations in the prices of tin for the last 20 years. If to this document there were attached to each variation in price of tin the margin as between the seller and the buyer, it would be a guide such as the county requires in dealing with the future sales of black tin.

Camborne, Jan. 10. SESOSTRIS.

DEFUNCT AMERICAN MARKET MINES.

SIR,—As the present appears to be the most opportune time for the resuscitation of mines which have ceased to work, and as I notice many such are about commencing a new and, let us hope, prosperous era, may I ask as an old shareholder if anything is being done to put the once celebrated Camp Floyd Mine on a new footing. Eight years ago this was proclaimed as the best mine in America, but it seems to have been overlooked altogether. If my brother-shareholders will put their shoulders to the wheel we stand a good chance of opening up a lasting mine. A. C

Peckham, Jan. 18.

COLORADO UNITED MINING COMPANY.

SIR,—For the general accuracy of your report of the meeting of this company, at which I, as a shareholder, was present, I can vouch; but there are two slight omissions. The first was that it was anticipated that a dividend at 1s. per share would be paid in March, which it was hoped would be the first of a regular series of such dividends. The second was that the manager, as the holder of 100,000*l.* worth of shares, was firmly resolved on holding every one of those shares till they reached par value. TACHE SANS TACHE.

NOUVEAU MONDE GOLD MINING COMPANY.

SIR,—The purchase of the Nacupai Mines of Venezuela, for which this company was so long in treaty, has been effected, and the title deeds deposited at the bank in Trinidad. This has been officially announced and confirmed by Messrs. John Taylor and Sons. Not only is the future of the Nouveau Monde thus practically assured, but fresh evidence confirming the value of the acquired concessions is now volunteered by those who were previously hostile to the company. The end was not attained without a struggle. Great credit is due to some few members of the Stock Exchange for befriending the company in its greatest moment of need. No one will envy them their reward. Two years ago the shares were utterly valueless, and not even quoted, for they represented the anomalous position of a mining company without a mine. The company now possess ten mines, machinery consisting of 50 head of stamps, with 150-horse power engine and other requisites, all in good working order. The machinery alone, as estimated by experts, could not be replaced for 60,000*l.*, and they will have a working capital of about 30,000*l.*

Reverting to the value of the mines, I cannot do better than transcribe the gist of Mr. Charles Oxland's report based upon his second examination of the property, and after the mines had been pumped clear of water at the vendor's expense as agreed. He thus writes:—Nos. 4, 5, 6, and 9 concessions form the cream of the district; the lodes are large, and can be traced for a considerable distance on the surface alone, No. 5 giving a lode 3½ ft. wide at the surface that has already yielded 2½ ozs. to the ton of quartz. No. 9 concession is quite unique, being proved of greater value without cost to us, its owners, for through the ground immediately adjoining our boundary, the same lode continuing into our concession gives 4½ to 5 ozs. of gold to the ton. This is a feature of the utmost importance, foreshadowing results which are certain. The value of the lode in No. 9 concession has been already proved to a depth of 270 ft. Nos. 1 and 2 concessions I estimate will provide a good dividend, and enable the shareholders to form a reserve fund for the development of the remaining concessions.

Before concluding with the evidence furnished by Mr. Charles Oxland, I may say that he assured me that with machinery and a working capital of about 25,000*l.* the shareholders would derive from Nos. 4, 5, 6, and 9 concessions alone a clear net annual income of about 60,000*l.* within six months from working. During the delay in the completion of the purchase, and after Mr. Charles Oxland's second report, his term of engagement with the company expired, and he has accepted an engagement from the proprietors of El Callao. Messrs. John Taylor and Sons, when commenting upon his reports, refer to him as a gentleman of whom they conceive the highest opinion for his integrity as well as his ability. Mr. Lewis, one of the directors, arrived at the mines about Christmas, and results by wire in support of what I have stated are daily expected. FACTS.

NORTH BUSY UNITED MINES

SIR,—I have read in last week's Journal the letter of Capt. Joseph Prisk, denying certain reports that were given the previous week. Permit me, as one who has inspected the mines several times, to say that how any gentleman, who has the least respect for his honour as a mining man, can make such statements as he here puts forth, I cannot tell. Without following Captain Prisk in that part of his letter which refers to certain work, &c., done (upon which there is no question), I come to that part where he says they have driven about 13 fathoms east of the cross-cut at the 10 fathom level, by the side of a good lode, 10 fathoms of which is standing whole in the back of this level, and worth for this distance from 15*l.* to 20*l.* per fathom. Now, this term "standing whole in the back" implies that the lode is standing whole for the 10 fms. in length up to the next level, which would give 100 fms. or more of lode to take away, whereas I am prepared to prove that for the first 10 fms. driven east of cross-cut there are not 10 fms. of lode standing above the back of the 10 fm. level, and which, if taken at Capt. Prisk's own valuation, would give less than 200*l.* worth of tin. Why not have said that

there was ground standing in the back of the level about 2 or 3 ft. thick, which would have been accurate?

The 10 fm. level is driven 9 fms. west of cross-cut, and is said to be producing saving work for tin; this was reported the week before last to be very poor, and I now positively assert that in the whole 8 fms. driven when I saw the end last there was not a foot of the lode that would pay to stope at any price. The report to which Capt. Prisk referred stated that it was generally reported that the lode had been cut in the shaft, and was very poor. This Capt. Prisk denies, and says "We expect to cut the main lode in the shaft in about 2 fms. further sinking. Now, I would ask how does he reconcile this with the agents (his own) report of the mine published some three weeks ago, in which he said "We expect to cut the lode in the shaft within the next fortnight," and now after they have been sinking without any delay for three weeks he says "We expect to cut the main lode in about 2 fms. further sinking." I leave your readers to judge such reports.

When mine agents are called in to inspect mines they are expected to give faithful reports of the properties they inspect both in the interest of their clients and the public generally; this I have done when I have inspected the above mines, and up to the present I have no reason to doubt that the future results will bear out my opinion of the mine. ——— CHARLES CRAZE.

NORTH BUSY MINE

SIR,—I am glad that Capt. Prisk has at last spoken authoritatively about his mine in last Saturday's *Mining Journal*. The purser has also informed us of the condition and prospects of North Busy. These statements are a complete refutation of the reports which have been spread abroad for the purpose of depressing the price of the shares. I am told that every unfair means have been adopted to accomplish this object, and that as many as 500 shares have been thrown upon the market at Redruth in one night—sold for the end of February and even for the end of March, by one man, on the stock exchange at Redruth. Such transactions have never been known in connection with any other mine. The case is unique. I am a shareholder, but thought it advisable to have an independent opinion, and therefore wrote to a friend in a distant locality to inspect the mine for me. He says—"I find the mine looking very well indeed. I broke some stones of tin in the western end, and I believe that you will have a bunch of tin here very quickly. The shaft is down about 7 fm. below the 10 fm. level, and to make sure I went to the bottom, and I fancy the ground is changing and more water coming; but they have not yet cut the lode. You can take my word that the mine is looking very well and keeping up its returns and more than paying costs, and likely to do so for a long time to come."

I need not say that my mind is now quite at ease about North Busy. The fact is North Busy has been an almost unparalleled success. It is only nine months since the mine was started as a new concern. During that time all the outlay in engines plant, new shafts, &c., has been paid for out of the mine, without a single call on the shareholders. I hope the shareholders will support the captain. ——— A SHAREHOLDER.

REGULAR REPORTS.

SIR,—Numerous reports have been made to me respecting the difficulty of obtaining information with regard to the progress of mining companies. Some correspondents affirm that when they buy shares everything seems right, but that after they have purchased the company seems to be forgotten by everybody excepting themselves. These letters come from gentlemen who are not, it must be confessed, ordinary business men. But, nevertheless, could not shareholders, especially in our mines, be kept more frequently informed as to the progress of operations? It does seem to me somewhat unjustifiable for officials to keep shareholders out of information concerning the mines in which they are interested until the ordinary meetings come round. Our leading mines should set a good example. Why should not brief reports of our first-class mines appear in your Journal, for instance? Most of the offices are in Cornwall, and if a shareholder writes for information the only result is a sheet of note paper and three lines of writing. This is not as it should be. There are, I know, dark companies which profess to have offices in London, but they are out of the pale of civilization, and might be successfully attacked had it not been for the practice of some of our leading mine managers, who act under the not unquestionable motto of "the least said soonest mended."—*City, Jan.* 14. JOHN B. REYNOLDS.

NEW CATHEDRAL COPPER AND TIN MINING COMPANY.

SIR,—Your correspondent "G. R." should read the report of the meeting again, and he will see that the resolution to adopt the Cost-book System did not originate with the directors; neither the mover or seconder were directors. The directors, in common with all present, and at a representative meeting, supported and voted for it as best for the mine under its present circumstances, and as explained to the shareholders. The directors, as far as they know, are acting in perfect unison with the shareholders. All have one object—the early development of what they believe to be a valuable property.—*City, Jan.* 19. ——— E. ASHMEAD, Secretary.

MINING IN THE ST. BLAZEY DISTRICT.—No. II.

SIR,—I closed my last by referring to the very assuring junction that takes place at Wheal Union, not far from the present bottom, accompanied with a most congenial run of strata, and which I feel must have an enriching effect. Let "Observer" take his stand behind Scobbel's cottages, on the site of the strongly mineralised vein there appearing, and calculate the dips, and he will see that the present bottom of the old mine must be close upon that most important change. He will also see from the surroundings and the section of rock laid open on the way to the Killallen wells that this portion of the fractured uncongenial strata terminates to the east, and that valuable courses of ore may be expected in that direction, as well as westward, also under the canal, river, and moor. Let him also mark the highly congenial ground from Scobbel's Cottages to St. Andrews Bridge. Many years ago, just above this latter place, some good copper ore was found, but nothing whatever was done by way of following it up. Let him further take note of that strong range of mineral outcrops to be seen between Par Railway Station and the road leading from Little Par to Tywardreath, a piece of ground so highly worthy of a trial in a commercial sense. It is remarkable that Austin Treffry's agents did not urge this trial upon his attention. In his time what he sanctioned to be tried was proceeded with, whilst others were excluded, and would have been opposed by them. He reigned there as petty tyrant, opposing, upsetting, and overthrowing everyone who dared to presume to touch the locality being in his mind his especial domain. And his agents—Mr. Peace, at Par, and Capt. Puckey, at Fowey Consols, &c.—faithfully carried his desires into effect, caring for little or nothing except their master's approval. And to this tyrannical exclusiveness may be attributed the comparatively little that has been done in the locality to what should have been done with such distinct and well marked features in so many directions.

Whilst on this head I might observe that within the line of the range of these latter outcrops good stones of copper ore have been taken from shallow building foundations in Tywardreath. It may also be remarked that this piece of ground is not so far out of that parallel with Lanescot and Saul's range, so much coveted by the intelligent exploring miner. Let the reader accompany us back to Middleway Bridge, the site of Wheal Maudlin. Here is unquestionably the beginning of a productive range of mineral ground, necessary depth only being wanted. After getting down through the sand, silt, &c.—the ancient sea bottom—the first stratum struck was a fractured uncongenial pan of killas. But in the present bottom this has been succeeded by more congenial strata, and such as at Fowey Consols, Par Consols, and East Crinnis contained large quantities of copper ore. This underlying measure will probably be found yet more congenial as further depth is attained, as also the permanent strata.

It is much the same condition of killas that appears in the bottom of Scobble's under that indurated quarry stone just passed through where the quality of both tin and copper became at once improved, and underneath which no fear need be entertained that Scobble's would become less than a richly yielding mine. But before quitting Wheal Maudlin let me say that a great many able miners concur in the opinion that all that is required here is depth; and that its reforking and resumption commends itself in a commercial sense. With your permission I will next advert more fully to Scobbel's, where there yet remains an infinitely more productive yield than any thing seen heretofore in the former working. A MINER.

Ballycastle, Mayo, Jan. 13. ———

EAST DEVON CONSOLS.

SIR,—Having seen for some months past favourable reports respecting the East Devon Consols Copper Mine, and being in the neighbourhood this week, I visited the mine, and was much gratified to see the large blocks of lodestuff coming up. It is, indeed, most extraordinary looking stuff, thickly impregnated with ore; I should judge it to be of a high percentage for copper and silver. I was pleased to learn from the working miners that all which has been written of this mine is more than likely to be realised, and that in a short space of time.

There are now good veins of rich ore in view, and others within a short distance of the present workings. The same have been extremely rich, so far as they have been opened in the adjoining mine, and I am assured that the lodes will be found equally rich as they gain in depth at the East Devon. A company is being formed to fully develope this valvable property. TOURIST.

Buckfastleigh, Jan. 18. ———

SOUTH WHEAL FRANCES.

SIR,—I am obliged to Mr. Abbott for the explanation respecting the accounts, containing as it does very important information, which must be very acceptable to all, and especially to the distant shareholders. My grounds for suspecting that heavy liabilities not made known to the public existed arose from the fact that such important information, at such a crisis as the last meeting displayed, should have been withheld in the account given in the *Mining Journal* of Nov. 13 last; and I must confess, satisfactory as this explanation appears at first sight, that suspicion is not altogether groundless. The fact of merchants' bills being left unpaid from the end of September, or rather over a month, during which great alterations and renovations are going on, together with 200*l.* unpaid on Broad's engine, and still a great outlay before them, would seem to swallow up the so-called reserve fund tenfold. I must say, as the fact was not mentioned in the account of the meeting, that I did not nor had I any reason to suppose the two engines were paid for; but after all, this item is not such an important one, being two old second-hand machines, bought up remarkably cheap, and which, in my opinion, are not worth the labour of erecting in a permanent mine like South Frances. The mine being already overwhelmed with old machinery, it is certainly a mistake to add to it, though it, no doubt, answered the purpose like the rest of the tinkering, for which it was done—that of making an ephemeral dividend, &c.

Complaints have often been made in the Journal that the distant shareholders do not get satisfactory statements of the position of their property in Cornish mines, and I believe this has been demonstrated in the Journal repeatedly, without having produced any effect apparently. In saying this, I do not wish to single out Mr. Abbott, who, I believe, is always willing to oblige everyone; but one and all seem to plod along in the old track, which, I believe, is very prejudicial in the long run to Cornish mining, tending as it does to alienate many great capitalists from this interesting enterprise. It is certainly a very simple matter in presenting the accounts to explain these little matters, and wherever there is any apparent secrecy there is generally a very strong suspicion that things are really worse than they are in reality, and the withholding these items of information produces the exact opposite effect to what it is intended to do, and of course it would be well for the general body of shareholders to be more exacting in these matters, but unfortunately they seem to be too much absorbed about the dividend or the call; jumping at it directly there is a prospect of a dividend, and frightened out of it again directly a call is to be made, without considering the permanent welfare of the concern, and consequently we often see them taken advantage of by ephemery dividends and unnecessary calls. In fact, I believe if the whole of the machinery was sold in a mine to make a dividend there would be such a rush for the shares as to create a great rise in them, so little do the people think about the mine. Not long since a sharebroker said he did not care whether there was a mine or not in existence; all he wanted was a good trade and profit on the shares. W. NANCE.

CORNISH MINING ACCOUNTS.

SIR,—Many complaints have been made of late years respecting mining accounts, both in public and through the medium of the press, and many attempts made to correct the abuses of the system which during the depression had gradually crept in, and in trying to get all bills regularly charged up, as well as labour costs, to date of meetings, as well as crediting all returns to that date. Thanks are certainly due to those who have perseveringly worked with this object, and have insisted in bringing about a better state of accounts in our mines. Now that tin is at a fair average price, I think there is still something more to be done in this direction. In the deepest of the depression adventurers could not afford to pay off the full amount of their liabilities incurred (unknown to many, we regret to say), and this in itself has been one of the chief causes of Cornish mines being in such disrepute with the speculative public, and has undoubtedly done more injury to Cornish mining than anything else during the past 20 years, excepting the low price of tin.

The Cost-book System in itself is a most simple one, and should be strictly adhered to I would point out that under this system all cost should be charged at end of every three or four months, as the meetings may be held and all returns credited, the loss, if any, provided for by a call, or the profit divided, as a dividend. Now, if adventurers were to insist on this being done they would be able to judge for themselves the value of the respective mines in which they may happen to be interested, as well as being a guide to the investing public. But what do we find? Mines have been allowed to run in debt to the extent of 20,000*l.*; yes, and even 30,000*l.* liabilities have been incurred without their knowledge; and as we find history repeats itself, they are just as likely to do so again. We trust, however, shareholders will be more on their guard. There are a few exceptional mines at present where everything is not only charged closely up but paid as well; but we regret to add there are many where a miserable system of financing and cooking accounts is still believed in, and where, in order to go with public opinion, the accounts are pretended to be charged up closely, but not paid. In order to illustrate this point, I happened to meet a merchant a few days ago, and enquired, "Well, now that tin is up, I suppose you are paid more regularly than before?" He said, "I wish I was. My bills, it is true, are charged in many cases; but take the case of Carn Brea. I am owed two years' bills for monthly supplies. At Tincroft just the same, and also at Cook's Kitchen. Other merchants tell me that it is the same with them." Before tin rose we could not venture to speak of these things, but now tin is up mines can bear it, and can put themselves straight. Let us see all merchants' bills paid after every account meeting, and only the returns credited which have been sold, delivered, and paid for, not credited as sold and no money received and no tin delivered. It is by this means adventurers have been deluded, and are still being deluded, as to the value of their property. As the money which should pay merchants is used to pay the monthly labour pay, when the account comes round, not to show too heavy an overdraft at the bank, and the tin bill for the last parcel of tin is not credited in the bank book, as the tin has only been sold on that day, and a very good reason for why, because the tin is not delivered, and is not paid for, and so the bank has not the usual thirty days' draft to credit, and which may encroach considerably on the next quarter's returns to pay off the tin credited in the former quarter, and supposed by the adventurers to have been sold in the former quarter: hence the investing public have not a fair statement of account on which to form an opinion, either to buy or to sell. The mines have to pay a higher price for their materials, and are not free to buy as cheap as they otherwise would be if paying regularly every three or four months. Merchants must live out of it, and to give such extended credit the interest on their capital must be made out of either higher prices or lower quality articles supplied.

Let us therefore, one and all, set our faces against this miserable system of financing, get our accounts charged and paid, taking credit only for produce sold and actually delivered and paid for during the quarter's working, then the outside public will have no grounds for complaint if their judgment is wrong in making a selection for investment or speculation in Cornish mines, and one and all will reap the benefit. More capital will be invested, and more mines opened up, because there will be more confidence.

Redruth, Jan. 20. ——— RICHARD PENBERTHY.

SOUTH CARADON MINE.

SIR,—As it is probable that this mine will show an adverse balance at the next meeting of shareholders, and as we appear to be on the eve of making calls, would it not be desirable, in order to economise the present heavy costs of the mine, that some reduction should be made in the salaries of manager and purser, which is in excess and higher than any other mine of greater magnitude in Cornwall or Devon; in addition to other emoluments and privileges enjoyed by them in connection with other mines.

Jan. 21. A SHAREHOLDER

[For remainder of Original Correspondence see this day's Journal.]

MINING IN ST. AGNES.—This parish, particularly about the Churchtown, may now fairly claim to be quite in heart and spirit, taking into account the number of mines at work, and considering the present unusually good prospects of most of them, and it is with no ordinary gratification that we learn that preliminary arrangements have been made and a spirited party formed for the purpose of working Wheal Coit and Wheal Friendly, the ground being in the midst of the best producing for tin in the neighbourhood, having immediately outside the boundary the well known Royal Polberro Mines, which have produced immense quantities of tin and yielded enormous profits, the Trevaunance Mine adjoining, standing in about two acres, which has been worked by the freeholder for a considerable period, and yielded to him more than 200,000*l.* profits upon the tin sold therefrom. These two mines are parallel with the Wheal Coit and Friendly, and with precisely the same strata and channel of ground, so congenial for similar production—West Kitty, which bids fair to be one of the best tin producing mines in the county, judging from the present prospects, and the splendid masterly lodes now being opened and worked; Penhalls and Wheal Kitty Tin Mines, which have produced and are still producing, and will in all probability continue to produce, large and regular quantities of tin, and to be long recognised among the dividend-paying mines of the county; and Wheal Coates, which has raised and is still raising a good deal of tin. Now, returning to Wheal Coit and Friendly, the richest lodes of the latter mines referred to pass through the sett, and indeed from the sett itself very large quantities of tin have actually been sold from a very shallow depth, and we know of no undertaking where the gentleman introducing the sett and the gentlemen who may have become shareholders are to be more congratulated than in this. We cannot view this as an ordinary investment, nor can we look upon it as a chance speculation, but with a moderate outlay Wheal Coit and Wheal Friendly will hold itself well among its neighbours, and be one of the leading and permanent dividend mines in the county. The amalgamation and concern has been started as and is now known by the name of South Polberro.

REPORT FROM CORNWALL.

Jan. 20.—Unless we have a speedy change in the weather our mining interests, and especially the operations of our tin mines, will be seriously affected, and a large reduction in the output of tin result. Winter is always more or less a trying time for mining operations, the heavy rainfall current in these western parts, as a rule, entailing a considerable increase in pumping charges. That, however, can be met, for there are few mines of any importance that have not a substantial reserve of pumping power to enable them to tide over such periods of pressure. When we are visited by severe frost, and when instead of rain we have heavy and continued snow storms, matters assume a very different aspect, and the result is the practical stoppage of all dressing operations that depend, and most of them do, on the agency of water. In the depths of the earth the temperature is pretty much the same winter and summer, and tinstuff can be raised well nigh as readily under one set of conditions as another. It is when it reaches the surface that the difficulties begin. The weather during the past few days has been more severe than we have known it for many years past—though there are some rather favoured localities—and the pinch has been felt all the more severely because as a rule we are not used to such extremes, and because, too, up almost to the past week the season has been of unusual mildness even for this genial West. If we are to have a continuance of cold and inclement weather dividends must suffer. Few mines have such a reserve of dressing plant, and so large a dressing staff, that they can make up in the course of one account for the lost returns of a week or fortnight, and that may make all the difference between profit and loss. However, the contingency is an unavoidable one, and we must make the best of it, hoping that a decided change may not be far distant. The drop in the standard would be of very small consequence compared to a continuance of the severity, at any rate just now.

The boiler explosion at Wheal Eliza, which has happened since our last report, on the face of it appears to be one of those mysterious casualties which will occur in defiance to all precautions, and apparently in opposition to any provision to the contrary. There is not in the whole of Cornwall a mine which is better managed than Wheal Eliza, or which is in the hands of one more competent for the efficient discharge of its operations. It is, in fact, regarded as a model mine, and that it should be the scene of such an explosion is, indeed, remarkable. It is quite possible that the cause of the accident may never be clearly explained. A few years ago boiler explosions were by no means so uncommon as they have been since the enforcement of the provisions of the Metalliferous Mines Inspection Act, and then the only wonder was that there were not three times as many. Do what man will, however, there are always elements of uncertainty in dealing with the forces of Nature, which show how needful is the most rigid care, even though at times every effort may seem to be defeated.

Cornwall is about to sustain a severe loss by the removal of Mr. J. H. Collins, F.G.S., to Spain, in consequence of his acceptance of the headship of the chemical and metallurgical department of the Rio Tinto Mines. It is now a good many years since Mr. Collins came into the county in connection with the Miners' Association, and from that time to the present he has shown the most active interest in all matters of local scientific research and practical mining skill. He is, or has been, connected more or less prominently with every scientific or practical association in any way allied with the special interests of the county. For some years he was the secretary of the Polytechnic, and he is now the secretary both of the Miners' Association and of the Royal Institution of Cornwall, and of that far more widely known association the Mineralogical Society of Great Britain and Ireland, of which he is, in fact, the founder. His "Mineralogy of Cornwall and Devon" is indispensable to the study of local mineralogy, and his recent researches in Cornish stratagraphical geology and microscopic petrology—especially of tinstone—have been thoroughly original and important. He has written largely, and well too, upon general and local scientific questions; and has thus in every way identified himself with Cornish interests. The last of his services to practical mining was the conduct of the important experiments of the Explosives Committee; and among the posts which his departure will vacate is that of public analyst to the county. His departure following so closely upon that of Dr. Foster, is a heavy loss to the scientific strength of Cornwall; but much as this may be regretted, he will carry with him none but

good wishes for his comfort and prosperity in his new and important field of labour. A more clear-headed and indefatigable worker, probably, does not exist. Mr. Collins will leave England for Spain early in February.

A sketch of the life of the late Mr. W. Webb, C.E., which gives the chief features in his remarkable career, has just been printed, and is illustrated with a capital photograph of this true Cornish worthy.

REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

Jan. 20.—The severe weather is causing much inconvenience at the mills and forges consequent upon inadequate supplies of fuel, and unless a thaw sets in operations will soon have to be suspended. The canals in several parts of the district are frozen up, and the supply of coal by water is almost entirely stopped. The railway companies are able to do only a very small portion of the work which the canals cannot accomplished. There was not a large attendance upon 'Change either in Wolverhampton yesterday or in Birmingham to-day, but prices were, on the whole, as firm as a week previously. Barrow hematites were increased in price by 2s. 6d. a ton, and Blaina pigs were quoted at 75s., or a rise of 5s. upon three weeks ago. Tredegar hematites were 72s. 6d. Prices were too high to encourage business. A good order on Government account for cold-blast pigs, which will take several weeks to execute, has been placed in this district. The iron is to be converted into shells. Finished iron did not change hands in much bulk to-day. A rise in some cases of 5s. per ton was asked by the sheets firms, but consumers refused to give the advance. Some merchant singles were obtainable at 7*l.* as a minimum. Marked bars were firm at 7*l.* 10s., and for common bars 5*l.* 15s. was asked. Gas strip was to be bought at from 6*l.* to 5*l.* 17s. 6d., and bedstead strip at 5*l.* 12s. 6d. as a minimum.

Some of the Cannock Chase colliery owners have benefited by the strike amongst the Lancashire colliers, and during the week some good orders for coal to be forwarded to towns in Lancashire have been received. There is, therefore, more activity at the pits this week where carriage by railway is easily available.

Messrs. Nettlefold and Co., the screw and cut-nail manufacturers, of Birmingham, have just purchased the Shrubbery Ironworks, Wolverhampton, which were formerly carried on by Messrs. Thorneycroft and Co., but which for a year or two have been standing idle. The works will shortly be put in repair for making sheet-iron of various gauges. The purchase has been made from Mr. S. Loveridge, of Wolverhampton, who bought the works when Messrs. Thorneycroft retired from the trade.

A large meeting of ironworkers was held at West Bromwich, on Monday, when it was decided to continue at work under the present sliding scale; but Mr. Capper, the operatives' secretary, was instructed to give notice in March next for an alteration in the basis of the present scale.

At a quarterly meeting of the South Staffordshire and East Worcestershire Mining Accident Fund, held at Wolverhampton, on Wednesday, 40*l.* 10s. was paid to the widows of nine colliers, who during the quarter had met with their deaths whilst at work. This was the largest amount ever paid in one quarter. After these payments there was a balance at the bank in favour of the fund of 20*l.* 3s. 10d. on dividend account and 28*l.* 18s. 8d. on capital account.

REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

Jan. 19.—The letter of a "Shropshire Miner," which appeared in last week's Journal, deserves attention, and I shall be happy, as far as I am able, to give him the information he asks for relative to the geology of the Shropshire lead mining district. Beginning on the east we have the older Cambrian rocks of the Longmynd dipping north-west, and if we could follow these along their underground course we should see them, after numerous undulations, rising to the surface on the east side of the Merionethshire anticlinal in the wild region about Cefn Cwm and the Rhinogs, on the north-west side of the Barmouth estuary. Resting upon these, and dipping north-westward, is a considerable thickness of the Lingula Flags, corresponding to those seen on both sides of the Barmouth estuary, and in the shaly rocks about Portmadoc. Lying upon these, and in many places partly intrusive, are the rough bedded and compact rocks of the Stiperstones, answering to similar rocks that lie at the base of the Arenig and Llandeilo groups of strata in North Wales. Upon the Stiperstones, and still dipping at a great angle north-west, comes a great thickness—about 5000 ft.—of the Arenig and Llandeilo strata. A few miles to the north-west these strata bend upward again, making a trough, in which lies a thick deposit of the "Bala" beds, with a thin capping of Llandovery strata. The lodes of the district have a general direction of W.N.W. to E.S.E., with two or three important exceptions—the great Roman lode of the Roman Gravels Mine being one of them, and a productive lode formerly worked at Perkins Beach being another. These have a direction nearly due north and south.

In the Cambrian rocks of the Longmynd, and in the grits and compact rocks of the Stiperstones, the lodes when productive, which they are not to any great extent, yield copper chiefly, the intervening Lingula Flags being for the most part barren of ore of any kind. The great lead-bearing strata are the Llandeilo and Arenig beds, just referred to. They consist of dark-blue slaty beds, grits, and shales, interstratified with porphyritic strata of various kinds, the whole series being traversed by greenstone and felspathic dykes. The lodes yield most lead ore in the hardish slates. In the very hard strata the lodes become contracted, and they are unproductive in the soft shales. There are three principal deposits of shale, which divide the ore into four floors, as they are called in the neighbourhood. As the lodes ascend towards and into the overlying Bala rocks they become more largely charged with barytes, the lead ore disappearing for the most part. It is along the two edges or outcrops of the trough of Llandeilo strata that the principal mines are placed. Thus along the eastern edge we have, beginning on the north-east, Snailbeach, Mytton, Dingle, Perkin's Beach, Tankerville or Oven Pipe, Pennerley, Stiperstones, and Bog, while on the western edge we have Batholes, West Tankerville, Roman Gravels, South Roman Gravels, and Ladywell. The country lying between these two north-east and south-west rows of mines being filled with the newer strata, so that it will not, save at a very great depth, prove remunerative mineral ground. To the north-west of the western row of mines also the same newer beds come in, covering at a great depth the lead-bearing strata.

What has been wanted in the past has been a close and intelligent observation and record of the strata passed through in the shafts of the various mines. Had this been done we should have had more data for determining the depths at which the lodes in the different mines would become productive.

When I referred to this district some weeks back I was and am still desirous of getting at the past history of the various mines, their owners, managers, good and bad times in a sort of mining gossip; in fact, which may be worth preserving, but which if not recorded soon will be lost for ever.

I observe a long report of the South Roman Gravels in last week's Journal. It is a marvel to me that past workers have not sunk a shaft upon the course of the Great Roman Lode, which at no great distance from the boundary of this property to the north is so very productive of ore. This is the point Captain Ridge and his friends should concentrate their attention upon. As the course of the lode very nearly coincides with the strike or direction of the strata similar results may be expected at similar depths.

I wish success to the effort to reconstruct the New Prince of Wales Slate Quarries Company. There is no doubt but that the same beds of slate worked at Glanyrafon and the quarries about Rhyddu are in this property also. I should also like to hear of the commencement of operations at Gorsedda Quarry. The North Wales colliers, who by accepting the principle of insurance, have shared as men ought to share the responsibilities of the Employers Liability Act are benefitting by the strike of the colliers in Lancashire against such an arrangement. The price of North Wales coal has advanced 2s. per ton, supplies of it being required for shipping orders on the Mersey, and for manufacturing purpose in Lancashire. The dispute between the Van Consols Lead Mining Company and the Highway Roard, which a little time back seemed likely to be settled amicably, is now to be carried to one of the higher courts of law.

REPORT FROM DERBYSHIRE AND YORKSHIRE.

Jan. 20.—Affairs at several of the coal mines in North Derbyshire and South Yorkshire are in a most unsatisfactory state, and a large number of men have come out this day. It was stated by the Miners' Association last week that the notice gi en by the men a fortnight ago would be withdrawn and an endeavour made to arrange the wages question by a friendly discussion. On Monday last, however, at the meeting of delegates held at Barnsley it was agreed that where notices were given for an increase of wages the men should act upon them and leave work. The masters have refused to give what is asked, or indeed any advance whatever, on the ground that they are not able to do so, for they are not as a rule making any profits whatever, nor have they been doing so for a considerable time past. How the men are to be supported is by no means clear, as it is understood the association has no funds in hand. The men at the Denaby Main Colliery are also out on strike, and are to be maintained by the association; but where the money is to come from no one appears to know. The strikes, however, are not likely to be of long duration, for an empty treasury is their greatest enemy. The Employers' Liability Bill has not made much stir, but it has been adopted at a few places; but at the collieries in Derbyshire and the West Riding, where the men are members of the Miners' Association, there is no intention of contracting out of the Act.

The iron trade of Derbyshire is tolerably good and there has been a full average output of pig, but rolled iron is still quiet. The foundries continue to do a steady business in pipes and general castings, but there is plenty of room for improvement. At the steelworks at Dronfield there is now considerable activity, some extensive orders having just been placed for steel rails for shipment, the price being 6*l.* 16s. delivered in London. At the collieries business has been good, and a large tonnage of household coal has been forwarded to the Metropolis from Clay Cross, Blackwell, Grassmoor, Eckington, and other places. A good deal has also been put on to the Great Eastern for London as well as for stations eastwards. A little more has been done at some places in steam coal, but the demand is still dull, and prices rule dull. Engine coal has gone off better of late, and there has been a fair trade in gas coal. At Unstone the colliery which has been in liquidation is likely to be shortly at work again, as it has been brought out as a limited concern with a comparatively small capital. The royalties for the Silkstone and other coal are lower than at most mines, so that the concern, even at the present time, should be made to pay a good dividend.

In Sheffield business as a rule is good, and some branches are more than usually active. The Admiralty has at last determined to adopt composite plates, not only for the sides of vessels but for the decks as well, and a good order for them for the latter purpose has been received at the Atlas and Cyclops Works, which will be followed no doubt by others. Good orders have also been received for ship and boiler plates, hoops, telegraphic and other wires. The Bessemer works are busy, there being plenty to do in rails and every description of railway material, and some firms are more than usually busy in carriage wheels. The cutlery establishments are favourably off for business, America continuing a good customer, whilst reports from travellers in the home markets are more assuring. In crucible steel there is more doing for cutlery and other purposes. The engine works are now better off than they have been for some time past, and the same may be said with respect to the mechanics' shops. There has been a steady output of pig-iron and stocks have not materially increased of late.

In the South Yorkshire district the coal trade has been good, and the strike in Lancashire has led to many orders being sent for house and other coal; so much so, indeed, that the Manchester and Sheffield Railway has been unable to cope with the traffic. Steam coal has been in rather better request, still stacking has to be resorted to. Engine coal has also sold more freely, owing to the closing of so many Lancashire pits.

At Hoyland Silkstone the men are still on strike—that is, those who were working the Silkstone seam; but those engaged in the other beds are still at work. At Marsden's Winter Colliery the men have had conceded an advance, to take effect the next fortnightly pay day.

At some pits in South Yorkshire where notices were given a fortnight ago and expire to-day another fortnight will be worked and notices given by others, so that all will cease work together.

TRADE OF THE TYNE AND WEAR.

Jan. 19.—The Coal and Coke Trades continue to improve. The steam coal trade, which has been less active than other branches of the trade for some time, is improving. The demand for house coals has improved considerably. The demand for local use is very active, and for shipment there is also increased demand. The gas and coking coal colliers are generally fully employed. The shipments at Tyne Dock and other places on the Tyne and Wear have been above an average during the past week. There is no important change in rates quoted, but contracts have been completed in many cases at the improved rates lately noted, and prices are very firm, with a rising tendency. The contracting for the year's supply to the gas-works is going on steadily, and in several instances a slight advance has been got on last year's prices. An advance of 6d. per ton on house coal is expected shortly.

The weather has been very severe and the cold most intense during the past few days, and this has had the effect of clearing away in many instances the stocks on hand. The local demand for second-class coals is well sustained. The coke trade continues brisk, but traffic has been obstructed in some cases by heavy falls of snow on the branch lines. The Tyne is open three miles above the bridges.

The marine engine trade is very brisk on the Tyne, Wear, and Tees. Extensions on a large scale are in progress at Palmer's works at Jarrow. The new works for marine engine construction at Wallsend will be commenced shortly. At Messrs. Richardson's works at Hartlepool, and at the works of Messrs. Blaird, at Stockton, large extensions are in progress. At the great engine works of the North Eastern Railway Company, at Gateshead and at Darlington, there is much activity, and at the latter place a large extension is to be made. Iron shipbuilding continues very brisk in this district. The works at Jarrow and most of the large works are fully engaged. The works of the Jarrow Company, which have been closed some time, on the north side of the river at Willington, are to be re-opened immediately. The new shipbuilding works at Scotswood will be opened as soon as it is possible to complete the necessary erections.

The results of the quarterly iron trade meeting last week has considered by some sections of commercial men as encouraging: but, on the whole, there is an opposite feeling. It is true, that the renewed activity at the opening of the year has proved to be, to a certain extent, a spurt, caused partly by undue speculation; but the future of the trade appears to be encouraging. Makers quote uniformly 42s. 6d. for No. 3 for delivery up to April, and it is expected that prices will improve as the year advances; both makers and merchants hold it firmly. Shipments have been large during the past few days, and there has been also large shipments of steel rails. The manufacture of steel, as well as iron, promises well for the present year. The finished iron trade continues very steady, and the prices, though not high, are certainly fair, better relatively than the price of pig-iron. Messrs. Connall's warrant stores have a stock of 131,700 tons—an increase of nearly 2000 tons on the week. The make of finished iron in Cleveland and Durham during the past year is now estimated in anticipation of the returns as follows:—The total output of rails, plates, bars, and angles was about 520,000 tons, more than 100,000 tons in excess of the productian of the previous year. About 65 per cent. of this iron has been plates. At Consett alone 1700 tons per week are produced; these are the largest plate-mills in the world. There has been a large increase in the production of plates at Stockton and the Tees district generally. At Middlesborough, on Tuesday, the market was very quiet, but makers adhere to late rates—42s. to 42s. 6d. for No. 3—for the current quarter. Warrants 42s. to 42s. 3d. for No. 3. The severity of the weather has limited deliveries, especially for Scotland. The prospects for the manufactured iron trade for the year are considered to be favourable. The steel trade is very good, and the output will soon be largely increased. There is some improvement in the foundry trade, whilst engineering branches report increased activity.

At Britton Mines 400 men have struck against Mr. Forster's award. Finished iron rates are—bars, 5*l.* 15s.; angles, 5*l.* 17s. 6d.; shipplates, 6*l.* 17s. 6d. Coal and coke show considerable firmness. The returns of the North-Eastern Railway Company for the past two weeks show that the receipts for mineral traffic continue to increase, but not to such a large extent as they did during the greater part of last year. The rates charged for conveying minerals and other goods by the company, as we have often noticed, are considered generally to be too high, and unless more consideration is shown by the directors to the protests of the great iron and coal masters and others there is little doubt that more active measures will in time be resorted to for the purpose of providing a remedy possible.

THE OWNERS' LIABILITY BILL.—The negociations between the workmen and the owners at the collieries in this district for a system of mutual insurance by which the men were requested to contract themselves out of the Act have so far failed, and the owners at some of the works have given notice that they will discontinue their payments in the form of "smart money," and also their contributions to the Miners' Relief Fund. The masters have also entered into an arrangement amongst themselves for insurance against damages they may be called upon to pay under the provisions of the new Act.

DEATH OF AN OLD COAL MINER.—John Ross died at Gateshead on Sunday last after an illness of one week. He was born at Byker on May 9, 1788, and was therefore upwards of 92 years of age. He started work at St. Anthony's Colliery on the Tyne when 10 years of age as a horse driver underground. He was a sledge driver, sledges being then used, and corves tramways having not been introduced. He was a coalheaver some years, and worked at the Hebburn Colliery, which was very fiery with the steel mill, before the invention of the Davy lamp. He was a sinker at the Seghill Colliery in 1824, and subsequently passed under the grades of deputy overman and underviewer. He was engaged about collieries until he attained the age of 74 years, when he retired from work.

THE PROPOSED MINING LEGISLATION.

As the result of the Conference held at Manchester last week, we are put in possession of the objects which the miners' leaders proposed going to Parliament for during the present session. Mineowners have suffered a good deal from the class legislation to which they have been subjected, for in almost every case it has led to an increased cost of production, but it is only fair that all of them should be placed on an equal footing, which they cannot be said to be at the present time. As instance of this we may say that in some districts the use of powder has been prohibited, whilst in others it is still carried on, leading to serious loss of life. Blasting is a much cheaper mode of getting coal than bringing it down by hand, and where it is carried on the mineowner has an advantage over the one who for safety sake trusts to manual labour only. As might have been expected, the Employers Liability stood first on the programme of the Conference, and a resolution was passed that Mr. Macdonald, Mr. Burt, and Mr. Broadhurst should bring in a Bill this session with the object of making it illegal for either workmen or employers to contract out of the Act. This may be looked upon as the natural result of the action taken by many mineowners to compel their men to accept terms outside the Act of Parliament, and that before it came into operation. As we have before pointed out, it would have been better to have let the Act had even a short trial, as we believe it would be found far less injurious than mineowners appear to think. The question as to what constitutes a colliery certificated manager, which has been differently interpreted, was next taken up. It has been held by some that a mining engineer could hold certificates as manager of several mines, and that the "daily supervision" required by the Act of 1872 could be construed into giving orders to deputies daily on receiving their reports, and without visiting the mines. For our own part we cannot read the clause in that light, considering that the words "under the control and daily supervision" were intended to apply to a person who was daily on the spot, and gave orders according to what might happen during the time the men were at work, so that no person could hold certificates as managers of five or six mines, and such, we believe, was the intention of the Legislature. The Conference passed a resolution to the effect that certificated managers of a mine, or part of a mine to which the Act applied, ought to be held to the person having the responsible care or control of the mine, and ought to be a properly trained and qualified viewer or mining engineer, and be the person in charge next to the owner. The question is one that has been much debated, and in the interest of all parties should be more clearly defined. But a still more important change is contemplated by the representatives of the miners, for they now ask that the underground manager or deputy shall hold a second-class certificate, and not be deemed the certificated manager, and that before any person acts as overman or deputy he shall undergo an examination as to his knowledge of gases and general competence by some person or persons appointed for the purpose by the Government.

This would be a sweeping change indeed, and would be the means of preventing many of the best and most practical working miners from aspiring to such situations for which they are in every way qualified. Mere theoretical knowledge in very many cases is subordinate to practical experience, and this the miners are the first to acknowledge. The question of more shafts—a favourite measure amongst miners—was brought forward. There is no doubt that more shafts would give greater security to the workmen, but at the same time it would be a most costly matter, especially in the present state of trade. Mineowners have as much as ever they can do to make both sides of their ledgers balance, and are certainly not in a position to spend perhaps 10,000*l.* or 20,000*l.* in sinking additional shafts. They pay certain royalties for their minerals, based on a certain state of the law, and to make them lay out large sums of money which was not taken into account when they leased the minerals would be a serious and at the same time a most unfair thing to do. We quite agree with Mr. Macdonald that it is the eternal question of cost that entered into the question. But cost is everything now-a-days, not only in mining but in every other industry. It may be quite true, as stated by Mr. Crawford, that if there had been a shaft a mile from the existing ones at the Seaham Colliery 100 lives which had been lost in the recent explosion would have been saved. At the present time at many places the shafts are too close to each other, but this cannot now be altered, although in the opening out of new mines it should receive every consideration. The Conference, however, agreed to a resolution that no working place or places should be driven more than a mile from any existing pair of shafts until another shaft or shafts had been put down, and at shafts so situated a mile from each other there ought to be placed a winding apparatus ready for constant use. This no doubt would be most beneficial, but we do not see how it could be carried out. The cost of raising the mineral would be greatly enhanced, so that many mines would be heavily handicapped as compared with others, and would not be able to compete in the various markets with them. This is a point we should recommend for the consideration of Mr. Macdonald and the other delegates, and we should be glad to see how they would propose to get over it—blasting with powder, one of the most important questions of the day in connection with mining operations. That it has been the cause of many serious and fatal explosions cannot be questioned, and that its prohibition would give greater security to the miners whilst following their employment cannot be doubted; therefore, we are inclined to go with a resolution passed at the Conference that the entire prohibition of blasting with powder or other dangerous explosive substance in every mine or part of a mine to which the Act applied where any gas was given off, or any accumulation of explosive gases was known to exist, should be enforced. Further, that in portions of mines which were distinctly and separately ventilated, and where fire-damp was known to exist, the use of powder should be prohibited

The Chairman (Mr. Macdonald) remarked that it was criminal to blast with powder where gas was known to exist; but, he remarked, it was said that some seams could not be worked without powder, a contention which, on the other hand, was stated to be unfounded. We are certainly of opinion that there are no seams of coal that render blasting a necessity. A motion was also carried in favour of the appointment of a Minister of Mines. This is carrying matters too far, for were such a Minister appointed why not have one for the mercantile marine, agriculture, or any other of our great industries? The vexed question of the appointment of check weighman on the part of the men was taken up. At present the person appointed to that position is paid by the men, but he has to be a person who has worked in the same mine, or a mine belonging to the same owner. A resolution was agreed to by the Conference that the workmen ought to have power to place any person they thought proper on the pit bank to act as check weighman; that every tub or wagon of coal ought to be weighed; and that all weights and weighing machines should be adjusted at least once in every six months. Such a provision certainly appears a fair one, and we do not believe the great body of mineowners would object to it. Other resolutions in support of the necessity for miners acting together were passed, and it was resolved to send a deputation to Government urging the necessity of giving immediate attention to the wants of the mining population, and that the deputation should be made as strong as possible. From what we have sketched out it will be seen that during the present session of Parliament a new Mines Bill will be introduced, so that mineowners should be prepared to take action with respect to it.

MODERN GOLD MINING

The Causes of Success and Failure in Modern Gold Mining formed the subject of a popular paper read before the Society of Arts on Wednesday evening, by Mr. ALFRED G. LOCK, F.R.G.S., in which it was remarked that the working of gold mines is usually the earliest and the most rapidly remunerative enterprise developed in the countries where they exist, doubtless from the fact that their produce is unaffected by those conditions which have more or less influence upon almost every other production of nature or art—cost of transport, depreciation by time, and fluctuation of market value. Gold mining is often the first incentive to the occupation of new lands, and has been the primary cause of the progress of our most important colonies. Mr. LOCK calculates that 2,240,449*l.* of English share capital was invested in gold mining enterprises at the end of 1879, of which rather more than half was totally unremunerative, but of the remainder 110,000*l.* is returning about 3 per cent; and 896,750*l.* is paying from 10 to 50 per cent.; and that so far from gold mining being speculative and uncertain none is safer or more highly profitable, when properly conducted. The recent favour shown by the public towards Indian and other gold mines seems to warrant the selection of the present occasion for a consideration of some of the causes that determine the success or failure of their working.

That the soundness of the constitution of the undertaking, the presence of gold in the property, and the existence of the ordinary facilities for mining operations are essentials to success is so obvious that they need not be further mentioned, so that instruction to be gained from Mr. LOCK'S paper must be looked for under his third head—the knowledge how to extract the gold in the property, and the provision of suitable appliances for the purpose. Mr. LOCK does not pretend to any special knowledge of either mining or mechanics, so that it would be unfair to criticise his views as severely as if they were those of a practical man of long experience, more particularly as he has brought together much information which will be appreciated by investors in gold companies who desire a fair general outline of the industry with which they have connected themselves, but at the same time are placed at no disadvantage by the misapprehension of mechanical facts or by inaccurate views of scientific principles. There are, Mr. LOCK explains, three modes in which gold occurs—in the form of scattered grains and nuggets in alluvial deposits, having been liberated by natural causes from its original matrix; in the form of grains and leaves in mineral veins (principally quartz) still enveloped in its matrix, but not associated with any other metals, and technically known as free gold; in the form of grains imbedded in and most intimately asssociated with (not chemically combined with) various other metallic compounds, chiefly sulphides and arsenides, and commonly known by the comprehensive term pyrites, disseminated throughout veins of quartz or other mineral. He confines his attention to the free gold, and to the pyritous gold found in mineral veins.

The mere mining operations entailed in obtaining the auriferous rock may, in Mr. LOCK'S opinion, be passed over without any discussion as being thoroughly well understood and carried out; and in treating of the extraction of the gold from the material when mined his observations are, either from want of acquaintance with the subject, or from want of power to exprezs his his meaning, equally extraordinary. He states, for example, that the first process of the treatment in the disintegration of the material to such a degree of fineness as will enable the gold and the pyrites to be liberated from the non auriferous portions of the mass. After endeavouring to explain what stamps are, and remarking that "the stamps are established in a substantial framework, and are lifted by means of revolving cams or wipers," he says that the stamps should be round, never square, and each head should rotate, making part of a revolution each time it is lifted. It was, at one time, objected that the effective capacity of round stamps was less than that of square ones; but it has been proved, by careful experiments under like conditions, that they are equal in that respect, whilst the wear and tear is lessened by the revolution. Their weight and lift, and the speed at which they are driven, vary in almost every reduction works, opinions being greatly divided on each of these points. Their proper adaptation to the ore under treatment has an important influence upon the success of the operation. He mentions that the stamps heads vary in weight from 2 cwts. to 6 cwts., and that the height of drop varies from 2 in. to 11 in. To produce the former requires some mechanical ingenuity. His suggestions as to the sequence of drop, gauge of screens, and so on, are of the same character, and he directs attention to certain patented stamps, on the value of which opinions of course differ.

Appliances for arresting the gold (both free and pyritous) rendered separable by the stamping operation, are next referred to, and Mr. Lock displays an accurate knowledge of the names of some of the machinery and apparatus used, but as to their application in practice his description does not afford much evidence of practical experience; yet it must not be supposed that in compiling the paper Mr. Lock has not made any important discoveries. He has ascertained, for example, that the process used at Widnes for treating burnt ores is not adapted for use by the Indian gold companies, for after mentioning that both Plattner's and Claudet's processes are applicable to the treatment of auriferous pyrites, he says that with regard to Claudet's process Mr. J. Arthur Phillips, the well-known metallurgist, who was associated with Mr. Claudet in carrying out his invention, assures that it is quite unfitted to deal with ordinary auriferous pyrites, it being essentially a copper process, in which the gold is obtained as a bye-product at very small expense. He then notices Mr. Cosmo Newbery's suggestion, to roast the auriferous ores in a close furnace with introduction of steam, in order to oxidise the ore before crushing, and, in conclusion, he says that it may be interesting to illustrate the consequences of using suitable and unsuitable appliances, by a few examples of failure and success, quoted from official documents. As to the failures, he quotes Commissioner Raymonds statement, that after 20 years experience in the business of quartz mining, it is conceded that, with a few exceptions, from one-third to one-fourth of the assay value of the ores now being worked, amounting to several millions of dollars annually, passes off in the slimes, and is irretrievably lost; and mentions that in the case of an Australian mine, which was abandoned by the owners because they had no knowledge how to extract the gold from the pyrites, assays showed gold varying from 19 dwt. 14 gr. to 1 oz. 6 dwt. 3 gr. a ton, besides silver, the total value being 4*l.* 3s. 6d. and 6*l.* 4s. 6d. a ton respectively; and a sample of what was considered poor tailings gave 9 dwt. 19 gr. of gold, and over 25 ozs. of silver, the total value being 7*l.* 7s. 2d. a ton. He adds, that in New Zealand, too, no mining company has been able to pay a dividend from ore having less than 10 dwt. of gold per ton, a fact largely due to positive loss of gold, which, with proper appliances, might have been prevented.

Turning to the other side, he directs attention to what has been effected by proper plans of treatment, and refers to the Port Phillip Company which has to raise its ore from a depth of 700 ft. to 1000 ft. During the past 10 years it has treated 600,581 tons, the average yield of which was 5 dwts. 13 grs., the extremes being 3 dwts. 23½ grs. in 1873, and 7 dwts. 21 grs. in 1878. The same company has treated 3593 tons of pyrites, yielding an average of 4 ozs. 3 dwts. 17 grs. of gold when concentrated. The average total cost of treatment has been 3*l.* 13s. 7d. a ton; the average profit 13*l.* 5s. Another Australian company, getting part of its ore from surface workings, has profitably crushed 283,550 tons, with an average yield of 2 dwts. 22 grs. Another treated 7453 tons in seven months, with a return of 2 dwts. 10½ grs., and paid 2101*l.* 10s. profit. Another realises a large profit from a yield of only 1 dwt. 14 grs. per ton of ore crushed. But the most remarkable of all is the Imperial Company, at Ballarat, which has treated 2100 tons of quartz, affording only 21·99 grs. of gold per ton, with a fair margin of profit on the operation in other words, it has made money out of material which is only one-tenth part as rich as the non-pyritous material which its neighbours are throwing away. Of course, he remarks, some allowance must be made for the character of the ore in different cases, and the general conditions surrounding the undertaking; but he does not think there can be any doubt that if the knowledge already ucquired upon the subject of treating gold-bearing ores were judiciously and appropriately applied in all cases there would soon be a satisfactory return for the large amount of capital invested in gold mines, but which have not yet given dividends.

THE MINERAL WEALTH OF NORTH CAROLINA.

THE HOOVER HILL ESTATE.

Attention has frequently been directed to the mineral wealth of the Carolinas, but hitherto comparatively little has been done by British capitalists towards its energetic development, but there is the one satisfactory feature connected with the region that where English capital has been employed—for a few individual capitalists have already tried their fortune there—remunerative results have been secured. The introduction of the Hoover Hill Gold Mining Company will mark the commencement of a new era, and it is not doubted that joint-stock enterprise will prove quite as encouraging as private enterprise has proved. The company in question has been incorporated with a capital of 120,000*l.*, in shares of 1*l.* each, of which 40,000 are reserved as part payment of the vendors (who take the remaining 30,000*l.* of the purchase money in cash); 40,000 have already been applied for, and will be allotted in full at par; and the remaining 40,000 are now offered at par, the amount being payable by instalments extending to Feb. 18. The Hoover Hill Estate, to purchase which the company is formed, is a freehold mineral property, 283 acres in extent, in Randolph county, North Carolina, about 15 miles from High Point, which is within twenty-four hours' rail of New York. The prospectus, which will be found in another column, states that the Hoover Hill Mines were discovered before the outbreak of the civil war, and that for some time the people of the neighbourhood helped themselves to the gold without hindrance; then a system of leasing was adopted, the ground being divided into small tracts, and even under this desultory system large quantities of gold were taken from the surface.

The available quantity of auriferous mineral is, it appears, practically inexhaustible, both as regards remunerative auriferous clay-slate and quartz and quartzrite veins, which will yield many ounces per ton, and there are great facilities for turning these riches to account, for enough has been done to determine the locality of the veins, although but little of the mineral has been taken away. Mining has been entirely suspended since the war, and it was only at the beginning of last year that the whole property passed into one possession. A part of the estate is under cultivation, and the rest is heavily timbered with oak, pine, hickory, and mahogany—a fact of great importance. The river Uwharrie runs through part of the property, thereby ensuring a plentiful supply of water. Shorn of its angles, the estate resembles a parallelogram, and through its entire length for nearly one mile runs an auriferous channel of ferruginous clay slate some 400 ft. wide. In this belt are embedded quartz veins running parallel with each other. Towards the north-eastern side, at a point forming the highest elevation, about 200 ft. above the level of the river, is found a number of old workings and several shafts. Here a powerful quartz reef crops up to surface, and on it is found these old workings, which represent the entire exploitations made throughout the property. Lying about, in close proximity to these workings, are from 1500 to 2000 tons of quartz. Samples taken from these heaps and tested on the spot gave excellent results.

Referring to these auriferous quartz heaps, Mr. Josiah Remfry, M.E., who has carefully inspected the property, observes that whether this accumulation is owing to the ease and rapidity of mining compared with the slow process of dealing with the ore, and therefore represents the average quality, or whether in times past the higher grade has been selected therefrom, and the gold extracted by the aid of a Chilian mill now to be seen in ruin on the banks of the Uwharrie river, is difficult to say, but samples taken from these heaps and tested on the spot gave excellent results. The present proprietors had cleared for inspection two of the deep shafts—namely, Gallimore and Provost, sunk 104 ft. and 120 ft. heep from the surface. Samples of quartz taken at 70 ft. and 100 ft. depths, and from fresh blasts put in, on being bruised in a mortar and panned, showed very good results. Between these two shafts, and within a few feet of an old working called Briol's Pit, the owners are sinking on a quartzite vein, the width of which is not yet known, but at present it exceeds 8 ft. wide. Trials made of the quality on the spot were very satisfactory. Close by are Thomas and Lee's workings fallen in, and a little further off is Hawkins's Whim Shaft, full of water. Is is stated on good authority that a drift running out of this shaft and driven in soft clayslate, yielded gold, as much as 50 ozs. per ton, and it is said the former workers were driven out by pressure of water.

According to Messrs. Johnson, Matthey, and Co.'s assay, a sample taken from Gallimore shaft, about 70 ft. from surface, gave 32,500 ounces of gold per ton; another from the bottom of Briol's open cutting, about 20 ft. deep, 5800 ozs. of gold per ton; a third from Provost shaft, about 100 ft. from surface, gave 26,100 ozs. of gold per ton; two samples from Dumps, lying about Hawkins', Thomas', and Lee's shaft, yielded 1050 ozs. of gold per ton; one taken from open cutting, south-east of Hawkins' whim-shaft, gave 9450 ozs. of gold per ton; another from open cutting between Hawkins' and Provost shafts gave 4050 ozs. of gold per ton; and, lastly, a sample of ore from general workings picked gave 91,450 ozs. of gold per ton. Well may Mr. Remfry observe that in the face of such extraordinary results it may be necessary to state that these samples were taken indiscriminately from all points, and the nature of the mineral is such that a selection of it is impossible. The quartz from Gallimore, Briol's, and Provost was strongly mixed with dark clay-slate, but contained no sulphurets, but on close examination no gold was visible to the naked eye, yet these three places gave an average of 21 ozs, 4 dwts.

It would appear, moreover, that these riches are available forthwith, and that the facilities for working are considerable, inasmuch as Mr. Remfry states that for immediate supply for milling there is any quantity of ore ready at hand to be operated upon as soon as machinery can be got ready, and the quality is such that extraordinary results can, and will, be obtained therefrom. At the same time, this tunnel should be started at once, as it is plainly demonstrated that the ore is much richer in depth than can be obtained from shallow workings at the surface. Wages range from 2s. 6d. to 3s. for labourers, 3s. to 3s. 6d. for miners, and up to 4s. for picked men; 4s. to 4s. 6d. for carpenters, smiths, and enginemen. The cost of labour here is small in contrast to that usually paid in mining districts in the Far West. There is abundance of timber, plenty of water-power, and Mr. Remfry estimates that 42,000*l.* worth of gold can be obtained at a cost of 11,200*l.*, which leaves 30,800*l.* per annum profit, so that it is not surprising he should conclude his report with the observation that with so many facilities for cheap mining, which here form so prominent and pleasing a feature, and with a superabundance of high grade ore at hand, he has no hesitation in saying that Hoover Hill will before long rank as an important centre for the supply of the precious metal, and nothing can prevent a property of this description from paying profits on a much larger scale than he has ventured to foreshadow. The assays being so very high the directors have thought it expedient to send out Mr. H. Bauerman, A.R.S.M., a mining engineer, who has inspected the samples in London, from which portions for assay were taken, and who was specially recommended to them by Mr. R. Etheridge, F.R.S., President of the Geological Society, with instructions to make a careful inspection of the mines, and no payments will be made on account of purchase money until he has reported by telegraph to the satisfaction of the directors that he is able substantially to verify the accuracy of Mr. Remfry's report, so intending shareholders may have confidence that their interests are well looked after.

PIERREFITTE SILVER LEAD AND BLENDE MINE.

It has already been announced in the Journal that Mr. John Lean had visited this mine with a view to make a special report. This has now been issued, and in it he says that he wrote in September 1879 that the direction of the principal lode is parallel with the rise of the mountain, about west by north. Its back, being denuded of covering matter, can be traced, and is most conspicuously seen for a considerable distance up the mountain ridge. It is of gigantic width and strength, retaining its dimensions to the bottom of the mine, and is capable of yielding six, eight, and in places ten or more tons of silver-lead ore and blende to the fathom. The average of five samples analysed at the above-named date, was of lead 66 per cent., and of silver 40·57 ozs. per ton of ore, and two samples of blende yielded metallic zinc 55·30 and 30·45 per cent. respectively. These samples were analysed by Dr. Morgan, of Swansea.

As the result of his visit in December, 1880, he states that he found that the mine had "much more than fulfilled his utmost expectations, arising from the high opinion which he at first formed, and of which he wrote, of its merits—the lode opening out, as it were, in parallel sections or divisions, one riding on the back of the other, leaving a thin 'horse' of stone or rock between, and embracing in one place for a considerable length a width of at least 60 ft." In another part of the report he says:—"Many a rich mine have I seen, but never that I remember have I seen such a mass of riches as you have displayed in the Mine Pierrefitte. It must not be considered that the quantity of ore which I have named as yielded by the lode is all in a merchantable state; the greater portion will require dressing. Still, a a considerable quantity of it can be, and is, selected as at once fit for the market, without being submitted to any process of cleansing. Every niche and corner, and all the unoccupied space that can be found, both inside the mine and outside, are crammed full of ore, awaiting the erection of the new wire tramway, which is in a forward state of completion, although there is a daily quantity of 15 tons sent down to the dressing-floors by the original small wire rope. The space for the new dressing-floor is levelled, and advantageously laid out on the acclivity of the hill. All the requisite buildings—smiths' and carpenters' shop, house for the new crusher or crushers, as well as the wheel-pit for the wheel to drive them—are ready and prepared, awaiting the arrival of the machinery from England."

NEW MINERALS FOUND IN SCOTLAND—SCOTTISH ULTRAMARINE.

At the recent meeting of the Mineralogical Society of Great Britain considerable interest was displayed with regard to an instructive paper on Minerals New to Britain, by Prof. Heddle, of St. Andrews University. The importance of the subject was felt by many but slightly acquainted with mineralogical science, because they recognised the fact that it is such researches as these, conducted by competent observers, that lead to the discovery of new materials—the blackband ironstone for example—which form the basis of large and profitable industries. The last of Prof. Heddle's papers is not yet printed, but that on New Minerals found in Scotland, of which it forms the continuation, has been published in pamphlet form, and embraces descriptions of bhreckite, xantholite, abriachanite, and haughtonite. The first, which takes its name from Ben Bhreck, near Tongue, in Sutherlandshire, was found deposited upon the surface of crystals of brown quartz, and its immediate associates were specular iron and a calcareous strontianite. In appearance it resembled a very fine-grained dense aphrosiderite, but its colour, being a light apple green, was nearer to that of celadonite. It is distinguished from all the so-called chlorites, except glanconite, in being freely soluble in chlorhydrin acid. It appears to stand next to chronicrite, and in composition is not far removed from the metaxoite of Asp. Xantholite occurs near Milltown, in a singular rock composed of large crystals of smaragditic edenite and a matted mass of interwoven plates of a highly calcareous biotite, which much resembles talc. With regard to the analysis, the only decided difference between it and grenatite lies in the presence of lime and magnesia, and seeing that it is only lately that the presence of both oxides of iron has been noticed in grenatite, both might fall under the same formula, though the crystalline form appears to be different.

Abriachanite, named from one of the localities in which it occurs, has the appearance of kaolin stained of a peculiar tint. The breaking into the rock to a depth of little more than 1 ft., however, enabled them to get rid of surface moisture, and showed that the mineral filled the vein, not as kaolinic powder, but as a solid though much fissured schistose stone. There are three varieties of the mineral; it occurs in thin veins with a transversely fibrous structure, then there is the schistose variety, and the last variety is the clay. The claylike mass, picked clean and rubbed into a cream in a mortar with water, and the suspended portion decanted into a large jar of water. It was decanted several times from the heavier and coarser portions, and then set aside to subside from a large quantity of liquid; in seven weeks a little very fine and pure deposit was obtained, being like a pale ultramarine. The composition not only is not of the nature of kaolin, but from the absence of alumina, is altogether different from it. The attaining to any conception of the mode of formation of this Scottish ultramarine is as difficult to Prof. Heddle as was the attaining to the actual formation of true ultramarine to the chemists of a former generation, and probably can only be arrived at by an analysis of the unaltered, and also of the much altered rock matrix.

The last mineral described in the paper is a new mica—Haughtonite—named after Prof. Samuel Haughton, of Trinity College, Dublin. The new mineral appears to be a kind of Scotch lepidomelane, although certainly a different mineral. Physically haughtonite is somewhat heavier and somewhat harder than lepidomelane, and its characters as a whole give it a position which places lepidomelane between it and biotite. Various analyses which Prosessor Heddle has made of this mineral—arranged in geographical sequence, commencing with the deeper seated rocks, and rising in succession to the more recent—are given in support of this view. The paper is throughout highly interesting, and the Mineralogical Society of Great Britain may fairly be congratulated upon its forming part of their Transactions.

EAST CHILLATON AND ATWAY MANGANESE AND FELSTONE COMPANY.—It is stated that a company will shortly be registered under the above title with the object of purchasing and working the well known Wayy, Langore, Bowden, and Liddaton Down Manganese properties, situate near Lidford Junction, and about five miles from Tavistock. It is well known that the Wayy Mines were formerly owned by the Messrs. Williams, who reaped enormous profits from them, operations being suspended some years ago owing to foreign importations, which considerably reduced the price of the metal. When operations ceased this celebrated mine was notoriously rich in manganese. The Liddaton and Bowden Down Mines are eastward on the same lodes, and in close proximity to the Hogstor and

Chillaton Manganese Mines, the property of Messrs. Sims, of Tavistock, and the not less valuable Langstone Manganese Company's property lies further east. One important feature in connection with these properties is that they will be most economically worked by water power. This fact alone cannot fail to recommend the properties, as it is well known that the difference in working cost between steam and water power is in itself a substantial dividend to a company.

THE RARA FORTUNA SILVER MINING COMPANY.

The very name of Argentine Republic should be an encouragement to silver miners, and it is confidently believed that the Rara Fortuna Silver Mine, in the province of Cordoba, now being worked as a going concern, and for the further development of which a company of the same name, and whose prospectus will be found in another column, has been formed with a capital of 50,000*l.*, in shares of 1*l.* each, will afford additional justification for the name of the country by its great argentiferous wealth. The company are now inviting subscriptions for 35,000 shares, the remaining 15,000 shares and 15,000*l.* in cash being the consideration to be given for the property. It appears that the extent of land comprised in the purchase is about 17 acres, equal to a direct run of 1800 feet, the total length of the workings from north to south being at present 604 ft; this comprises three ordinary mineral grants of the Argentine Republic. The property is held in fee simple, subject only to the Government licence or tax, amounting to about 15*l.* per annum.

The company take possession of the mine as a going concern, with all the plant and machinery thereon, comprising engine, winding gear, pumps, mining tools, houses, &c., whilst native labour is cheap and abundant, and adapted for the work required; and practically and geologically the property has all the recommendations that need be desired. The prospectus states that the great mineral wealth of the Guayco Pocho and Minas districts of the province of Cordoba, in the last of which the Rara Fortuna Mine is situate, is well known and authenticated. Silver mines having been worked by the natives at shallow depths with the rudest appliances, and fortunes have been made. Geologically the lode is a true fissure vein, in a porphyritic formation, which according to the most scientific authorities is the true matrix for silver ores. The lode improves in value as depth is attained. The above formation also occurs in the celebrated Comstock lodes, which have proved so profitable in the United States. The width of the lode is over 3 ft. throughout the entire run of the workings, with clean well formed walls, with a good with of rich galena almost throughout its entire length. The mineral assays 60 per cent. for lead, and 250 ozs. of silver to the ton, so that the average value of the ore is 60*l.* per ton, or nearly 150*l.* per fathom; the production at present and during the past four months is about 1 ton of ore per day. The estimate of profits accruing from the mine, as at present worked on the low basis of the return of 1 ton of ore per day, is shown to be 816*l.* per month, which is eqivalent to 19 per cent. per annum on the total share capital of the company.

According to the report of Mr. E. N. Eddowes, formerly resident engineer of the Central Argentine Railway Company, and who will act as local consulting engineer, the mine is now in a very satisfactory condition. All the work on the surface is complete, and below ground the mine is good at all points. The percentage of silver also has increased, and a considerable amount of antimoniate of silver is now being brought to the surface. The shaft has been sunk on the lode to a total depth of 134 ft. The lode has not diminished in strength, but maintains its good qualities at every point. In the bottom of the shaft it is 3 ft. 3 ins. wide, with the same dip that it brought from the surface—80° from the horizontal. In the shaft the ground improves as they sink. In the gallery the ore runs almost uninterruptedly for the whole length, some of the stopes or bancos having a width of ore of 9 ins. Altogether, therefore, the company will commence operations under unusually favourable conditions.

FOREIGN MINING AND METALLURGY.

The condition of the Belgian coal trade continues favourable, and some improvement has even been remarked in it. The demand, however, might be much more active than it actually is at present. Some collieries are even accumulating stocks, although these latter are of comparatively little importance at present, and are rather the result of want of means of transport than anything else. Industrial coal is in good request in the Hainaut and in the province of Liége. Prices are firm, and show an upward tendency rather than otherwise. In the Centre orders are only accepted at an advance of 5d. per ton, and this demand has been agreed to by consumers. The German coal trade has not improved, but has, on the contrary, been scarcely so well maintained. Prices have not experienced any very appreciable change, but at the same time they have been maintained with difficulty.

The Belgian iron trade is pretty well maintained, but prices have not advanced, although the markets have been generally firm. Plates have been quoted of late at 7*l.* 4s. per ton. At a recent adjudication of steel rails prices ranged from 6*l.* 10s. to 6*l.* 12s. per ton, instead of 6*l.* 6s. 6d. per ton, the rate previously current. On various sides also the situation appears to be improving. Belgian iron-masters do not expect to do much with England this year, but France will be a pretty good client, and the same may be said of Spain and Italy. Several railway companies have recently addressed themselves to Belgian industrials with the view of obtaining additional supplies of rolling stock. The amelioration recently noticed in the German iron trade does not appear to have yet attained its final development. The pig-iron market has shown signs of improvement, and the works producing rolled iron also appear to be doing somewhat better.

Orders for iron of various descriptions still continue to come to hand in the Haute-Marne, and considerable activity prevails at the various ironworks. Prices have experienced no appreciable change. In the Nord prices are also without change, and they are at the same time pretty well sustained. At Longwy refining pig continues to be maintained with firmness. Orders have begun to make their appearance for the second half of 1881; some rather important contracts for pig have been concluded at 2*l.* 12s. per ton, but even on these terms producers do not appear very eager to enter into engagements for so long a time in advance. Orders have been well sustained for casting pig, and a good many transactions have taken place at 3*l.* 4s. per ton as the basis price for No. 3. The general rate for merchants' iron in France appears to be about 7*l.* 16s. per ton; for the present consumers appear to have pretty well provided for their requirements for 1881. Colder weather having set in in France there has been a certain revival in the demand for coal, but the retail dealers have principally profited from this state of things. Prices for coal have remained at about their previous level, but they now show firmness instead of feebleness.

JAPANESE SEISMOLOGICAL SOCIETY.—Prof. John Milne, of Tokio, writes that their Earthquake Society is flourishing, and that very shortly Vol. I. of the Transactions will be published. He thinks it probable that at no distant date he may return to England, although after four years' work he has "got a museum formed, made diagrams for mining, mineralogy, geology, &c., all of which I shall have to leave, will be very unsatisfactory. If I could have my diagrams and models I should be far more happy. I have models of crystals cut out of light wood 9 in. square which I use to teach with. To get the same things made in England would cost a fortune. Then there are my earthquake machines and earthquake laboratory, and the earthquakes themselves all to be left behind."

MACHINE MINING IN BRAZIL.—It was mentioned by the Chairman at a recent meeting of the St. John del Rey Company that they had recently put drilling machinery to work at their mines, that it was making very good progress indeed, and was the first introduced in Brazil. Mr. J. G. Cranston, referring to this favourable recognition of his services, congratulates himself upon being able to claim the honour of being the first in the field to have personally and successfully introduced pneumatic rock-drills into the country of Minas Geraes, Brazil, and is pleased to say the machinery continues to give the utmost satisfaction. The term of his engagement with this company is almost completed, and he is now about returning to England in order to make other arrangements for the further employment of this machinery.

SALES OF COPPER ORES.

COPPER ORES SOLD AT THE CORNWALL TICKETINGS, FOR THE QUARTER ENDED DECEMBER, 1880.

Mines.	Tons.	Amount.
South Caradon	1350	£7520 16 6
Mellanear	1675	5750 11 0
Devon Great Consols	2624	5379 15 0
West Tolgus	756	4167 9 0
Wheal Crebor	1067	3793 8 0
Gunnislake (Clitters)	384	2133 8 0
Marke Valley	625	1418 14 6
Glasgow Caradon	380	1411 6 6
Levant	189	1314 8 0
South Devon United	300	735 7 0
East Pool	313	722 12 0
West Seton	138	654 1 6
Botallack	50	329 9 6
Bedford United	105	320 5 0
Phœnix	40	231 0 0
Great Crinnis	32	164 16 0
Gawton	30	129 15 0
East Caradon	18	121 1 0
Carn Brea	33	93 4 6
Wheal Jewell	35	63 1 0
Cathedral	10	40 15 0
West Basset	14	33 15 0
Cotehill Consols	6	21 18 0

COMPANIES BY WHOM THE ORES WERE PURCHASED.

	Tons.	Amount.
Vivian and Sons	2,410	£ 8,291 15 7
P. Grenfell and Sons	1,913	6,909 0 9
Nevill, Druce, and Co.	2,376	7,585 4 10
Williams, Foster, and Co.	2,148	8,968 16 10
Mason and Elkington	533	1,681 4 0
Charles Lambert	794	2,914 4 0
Total	10,174	£36,350 6 0

COPPER ORES SOLD AT THE SWANSEA TICKETINGS, FOR THE QUARTER ENDED DECEMBER, 1880.

Mines. BRITISH.	Tons.	Amount.
Berehaven	211	1,021 9 0
Tan-y-Bwlch	76	569 19 6
Cambrian	51	366 15 0
Bampfylde	7	27 2 6
Total	345	£ 1,985 6 0
COLONIAL.		
Betts Cove	2722	£11,954 2 0
Union	477	2,471 9 0
Total	3199	£14,425 11 0
FOREIGN.		
Caveira	1110	£ 4,634 0 0
Virneberg	139	1,000 11 0
Cuba	26	704 3 0
Bogalho	32	449 12 0
Italian	33	252 9 6
Sobral	29	200 2 0
Total	1369	£ 7,240 17 6
RECAPITULATION.		
British	345	£ 1,985 6 0
Colonial	3199	14,425 11 0
Foreign	1369	7,240 17 6
Sundries	270	862 18 0
Total	5183	£24,514 12 6

COMPANIES BY WHOM THE ORES WERE PURCHASED.

	Tons.	Amount.
Copper Miners' Company	1094	£ 4,999 9 9
P. Grenfell and Sons	488	2,432 18 9
Nevill, Druce, and Co.	102	749 0 6
Vivian and Sons	263	1,352 19 0
Williams, Foster, and Co.	1344	6,078 10 6
Mason and Elkington	415	1,704 14 0
Charles Lambert and Co.	644	3,359 0 0
Landore Copper Company	314	1,766 14 6
Cape Copper Company	559	2,171 5 6
Total	5183	£24,514 12 6

THE VENTILATION AND SAFE WORKING OF MINES.

In a series of articles which recently appeared in the Journal we gave a description of the various systems of ventilating mines, and from these we propose noticing the present most approved methods of distributing the air in all working places, as well as the best safeguards for ensuring the health and lives of the miners. Those who work in mines require for their maintenance a certain quantity of atmospheric air, from which they borrow the oxygen necessary for their existence. The air being sent down pure in the first instance undergoes numerous modifications as it goes along, until it becomes unfit for the part it has to play, and becomes so impregnated with gas at times that it may explode when coming in contact with the flame of a lamp. The great object then to be attained is to have the ventilation such that the vitiated air is constantly replaced by a renewed quantity of pure air drawn from the surface, so constituting a continuous current constantly descending from the exterior to the interior of the mine, driving before it the air mixed with gas until it is sent to the exterior of the mine. It is, therefore, necessary, seeing that by means of its natural property of lightness fire-damp always finds its way to the highest places in all mines; that in arranging workings the course of the air currents should proceed in the same direction as the light gas, so as to prevent its accumulating, and assisting its natural endeavours to reach the highest levels—the atmosphere outside and above the top of the pit. To effect this the ventilation should ascend through the goaves, and no person should be employed at their upper edges, where there is not a sufficient current of air as the fire-damp gets to the roads and goaves, with black-damp at the bottom, and occasionally water below it. For the purpose of ventilation the furnace has had a comparatively long life, but of late years the fan has made great progress, for it has replaced the furnace in a great many old mines, and is now almost generally adopted in all new undertakings, for the best forms of mechanical ventilation have of late received more attention than anything else in connection with mining on the part of our ablest engineers. Fans have been in operation in this country for 30 years at least. At the Middle Dyffyrn Colliery, in South Wales, machines were put down at a cost of 1000*l.* by which 80,000 cubic feet of air were exhausted per minute. At Hepburn Colliery, where the quantity of fire-damp produced rendered the employment of furnaces dangerous, the late Mr. BUDDLE put down a double-acting air-pump, the cylinder being 8 ft. and 5 ft. square, and the piston making 30 strokes 6 ft. in length per minute. HERBURGER'S fan was in use more than 40 years ago, the egress of the air being prevented by a sheet-iron ring dipping into the water.

In Belgium and France the fans of FABRY and LEMIELLE are those that are to be found at many mines, but of late years the GUIBAL has has made considerable progress. The machine of FABRY is more frequently used for forcing the air through the mines than in exhausting it, and for which it is well adapted. LEMIELLE'S ventilator bears some resemblance to the rotary steam engine, and VERZY'S resembles it in several particulars. LETORET'S and LLOYD'S fans, not so much known in this country, can be worked up to 10 lbs.; and whilst the other machines named have the advantage of being aided by any natural ventilation which may exist, and exhaust sufficiently to ventilate most mines, where the air-courses are well laid out, yet like most quick-motion machines they exhibit a considerable loss of power. At the present time in this country the fans best known are the GUIBAL and the SCHIELE, which are now to be met with in most of our mining districts. So important, however, has mechanical ventilation become that there are now many fans in the market in consequence. Some of these, however, require large and expensive stone erections, which greatly increase the cost. This is not the case with others, like the SCHIELE, where such are not required, simplicity, power, and economy being the main objects obtained. The fan has many advantages over the furnace, and its adoption does not cause the slightest danger. By it almost any required amount of ventilation can be obtained, and we have seen fans producing from 250,000 to 300,000 cubic feet of air per minute. It may, therefore, be fairly assumed that the fan at the present time is the best and most trustworthy ventilator we have, and such is the opinion of our leading mining engineers and practical miners.

Next to ventilation in importance is the system of underground haulage in mines. Barrows at one time were used, and may be found at the present time in some of the mines in Cornwall, but rails have now been pretty generally adopted. The most approved carriage way used underground is closely allied to the best kind of railway at surface, the conditions in all essentials being the same; but, considering the special difficulties met with underground, the mining engineer cannot attain the same degree of economy as can be attained by the civil engineer at surface. Steam-engines are in operation at many places, but the value of compressed air as a power for underground uses is so apparent that it is now being adopted instead of steam, it being not only safe but easily applied, more especially as the distance increases at which the mineral is worked from the point of egress from the mine. Where power has to be applied at long distances from the shaft nothing can be more economical than compressed air. By it water can be pumped from the deep workings at the extremity of the mines which otherwise would have to be brought by more costly labour. In the case of driving a stone drift or similar work underground the drift could be ventilated by it without the trouble and expense of putting up a brattice to carry the air to the face of the drift, whilst the pipe conveying the air could be continued so as always to have the supply of air close to the workmen. It might also be employed to dislodge the fire-damp from the open goaves immediately behind the working faces, and thus render the places more safe to work in. For the haulage of minerals, however, air is now admitted to be the best and most economical power there is, and whilst so employed it can be used for many other purposes. It is also the only motive-power by which coal-cutting machines can perform their work efficiently and without danger to the mine. Coal-cutting machines are now being more extensively adopted than they were, but there are certain circumstances that appear likely to militate against their universal use. Unless the roof of the mine is of a texture as to admit of sufficient open space for the coal-cutter to stand between the props and the face of the coal, or if the coal will not remain *in situ* till the requisite extent of boring is completed, or if the roof of the coal be loose or full of joints, so that it cannot be worked longwall, then the coal-cutter cannot be favourably employed in the two first cases, and in the latter it would, probably, cost as much as by hand. Still, these objections existing to some extent at present, in all probability will be overcome by improvements, as is the case of most machines when first introduced. Coal-cutting machinery, no doubt, will become a most important factor in the economical working of coal, and compressed air must of necessity accompany it. The other essentials to the safe working of mines includes the prohibition of the use of gunpowder for blasting, especially in fiery mines, and it has been suggested that if gunpowder is to be prohibited at all would it not be better that all mines should be included in the prohibition. Some lamps which are termed "safety-lamps" are just the reverse, and this has been shown to be the case even with the "Davy." It is, therefore, necessary that a real safety-lamp should be put into the hands of miners. Where the mineral is brought down without powder there are hydraulic and other wedges that could be advantageously adopted.

In conclusion, we may say that where ascensional ventilation can be adopted it is by far the best. But as we are now situated we consider that where mechanical ventilation is adopted, gunpowder prohibited, the best safety-lamps put into the hands of the miners, the first general rule of the Mines Regulation Act of 1872 carried to the fullest extent, and the strictest discipline enforced, no explosions need be feared under ordinary circumsrances.

THE CLAYMOND LIGHT.

When the combustion of a material rich in carbon is sustained by oxygen an intense white flame is produced, and when the material is of a kind like hydrogen or carbonic oxide, that does not burn with a luminous flame, great heat is produced by its combination with the oxygen, so that the flame directed on a refractory substance, such as lime, renders it incandescent and causes it to evolve intense light. These effects are not produced when the flame is supplied with atmospheric air, a great portion of the heat being absorbed in heating the large volume of inert nitrogen that accompanies the oxygen of the air; but Mr CHARLES CLAYMOND, of Paris, has discovered a means and apparatus whereby a flame sustained by atmospheric air is rendered capable of producing the luminous effects of flames sustained by oxygen, this result being obtained by a preliminary heating to a high temperature of the air that sustains the flame, so that little of none of the heat evolved at the point of combustion is absorbed in heating the inert nitrogen. For the combustion of gas in this manner the air on its way to the flame is caused to pass through a tube of refractory material, which is heated to a high temperature by jets of gas playing against its external surface, and in order that the air may be more thoroughly heated the interior of the tube is divided by partitions, having apertures through which the air has to pass in zig-zag manner, being sub-divided into numerous streams directed against the heated sides of the tube. From the tube the heated air issues through small apertures and mingles with the ignited gas, producing a flame of intense heat, which, directed on refractory material, such as lime, causes incandescence thereof, as in the lime light.

A convenient arrangement for this purpose is to place the air tube with its internal partitions vertically with three, four, or more heating tubes surrounding it. These heating tubes are divided by partitions into a number of compartments, supplied respectively with gas and with air, and having small apertures communicating with cavities, from which jets of mingled gas and air issue by lateral holes. These jets being ignited and directed against the sides of the central air tube heat it to a high temperature. The air and gas are supplied to the air tube and to the heating tubes from annular chambers above the tubes, and the heated air issuing from the bottom of the central tube mixes with gas supplied to an annular chamber snrrounding the outlet, the ignited mixture issuing as a flame of intense heat, which is directed downwards on the refractory material, rendering it incandescent. For the combustion of solid carbonaceous material, such as coke dust or coal dust or pulverised charcoal, the arrangement of the apparatus is slightly varied. The air tube is placed centrally within a funnel-shaped vessel of refractory material, which is charged with the carbonaceous powder. This vessel has formed at its side three, four, or more pockets or cavities that are supplied with air, and have apertures by which the air can issue in numerous small jets among the carbonaceous material in the funnel, sustaining its combustion, and producing flames which are directed against the central air tube.

The products of combustion from these flames escape upwards by the annular space in a chimney or tube of refractory material surrounding the upper part of the central air tube. The lower air jets from the side pockets also cause combustion in the body of the carbonaceous material below the chimney, and the products of this combustion find their way downwards to a number of small apertures annularly surrounding the outlet from the bottom of the air tube. These products, consisting chiefly of incombustible carbonic anhydride, in passing through the heated carbonaceous matter become converted into combustible carbonic oxide, and this gas mixing with the hot air from the central tube produces a flame of intense heat, which issuing from the bottom of the funnel vessel is directed on the lime or other refractory material, rendering it incandescent. It is of advantage to sub-divide the incandescent material into a number of separate sticks or rods, which are inserted in a block of fire-clay supported below the flame. Such a fire-clay block with a number of rods of lime or equivalent material from it may, for safety of transport, be encased in paste-board or other combustible material, forming a sort of cartridge. This cartridge being placed below the frame, its combustible casing is immediately burnt off and the rods are rendered incandesent.

PROGRESS OF INVENTION.—The applications for letters patent for inventions recorded in the Patent Office during 1880 were more numerous than in any previous year, having reached 5517. In 1879 the

number was 5338, while in 1878 they amounted to 5343. With a few slight fluctuations, there has been a steady increase of business since the passing of the Patent Law Amendment Act in 1852, when a very sudden and extensive upward tendency manifested itself. In 1850 the number of patents granted reached 523 only, in 1860 the applications were 3196, and in 1870 they had increased to 3405.

THE SEAHAM COLLIERY EXPLOSION.

At the adjourned inquest a number of miners were examined, men who were in the pit at the time of the explosion, and other men who had been employed on the works many years. Their opinions vary as to the actual point where the explosion occurred, but generally they appear to agree in the opinion that it occurred in the main intake, and at no great distance from the shaft. John Turner, a fireman, thought that it had fired at the bottom of a staple, and was ignited by a paraffin lamp. Mr. Hales Harrison thought that the explosion had occurred at one of the engine fires, as great destruction had occurred there, and the blast had extended in all directions from that point.

The most important evidence is that of Mr. Stratton, who was manager at the time of the explosion. He detailed the circumstances connected with the explorations, the discovery of the fire in the Maudlin seam, and the consequent closing of the workings in that seam. In the No. 1 pit shaft siding the explosion had been very violent. Near the Polka way end the details he gives of the effects of the explosion are most extraordinary. The body of a man named Ramshaw had been quartered and blown in different directions; his foot was found in one place, and his body, or part of it, in another—his lamp was blown into a number of pieces. With respect to the point where the explosion occurred, he did not admit that it occurred at the furnace. He thought that it began somewhere between No. 1 shaft and the Polka turn. The region where the explosion occurred was between the main coal staple and the Polka turn. He did not attach much importance to the fact that dust was found at some points. He preferred the furnace to a fan for a large colliery like Seaham. He preferred the Mueseler lamp to all others. He did not think that another shaft at the extremity of the Maudlin workings would have saved the men. Richard Forster, of South Hetton, agreed generally with the views of Mr. Stratton. Mr. W. F. Hall, of Haswell, thought that the explosion took place at the Polka turn. He was asked the question as to another shaft, and stated that he did not think another shaft would have added to the safety of the men. The enquiry was then adjourned till February 9.

When it is resumed it is probable from the remarks of the Coroner that this important enquiry will be brought to a close. It is very important that the cause of the great calamity should be ascertained; what is the source of the gas accumulated, and the means by which it was ignited; and also what effect the dust which abounded in some parts of the mine produced in the explosion. The experiments now in progress, conducted by Mr. Abel, will, it is expected, be completed before the next sitting. The questions started respecting additional shafts will also, there is little doubt, receive some attention.

COMPRESSED AIR AS MOTIVE POWER.

An extraordinary invention has been tested at the engineering works of Mr. Daniel Adamson, of Dukinfield—Col. Beaumont's compressed air-engine—which it is claimed enables one-horse power to be obtained with $2\frac{3}{8}$ ozs. of coal. This unparalleled result has, it is stated, been fully verified by careful experiments with a dynamometer made at Mr. Adamson's works, so that either the new air-engine or the dynamometer will probably revolutionise existing engineering notions. The application of such a power to tramway purposes is naturally regarded by those who have confidence in its existence as a subject of considerable interest. It is explained that the engine works at an initial pressure of 1000 lbs. on the square inch. It is capable of continued action until the pressure has dropped to 200 lbs., thus leaving off work at a pressure at which most engines start. The principle on which the engine is constructed is to use no reducing valve involving a loss of power, but to allow the air, no matter at what pressure it may be, to be admitted at once to the working cylinders, arrangements being made by which a sufficient amount of heat is supplied to cause the air to expand whilst doing work without any loss of temperature. If it were possible completely to effect this there would be no theoretic loss in transmitting power by means of compressed air; this engine, as a matter of fact, transmits the power contained in air at 1000 lbs. on the square inch with a loss of only two-thirds. The results of the experiments with the engine are summed up as showing that 1 lb. of coal will supply 1 cubic foot of air compressed at 1000 lbs. to the square inch. This will give off under the dynamometer six-horse power—hence 1 lb. of coal burnt under the boilers of a compressing engine will enable six-horse power to be developed either for locomotive, underground, or stationary purposes.

It is well known that hitherto the difficulty in the application of compressed air has been attributed to the fact that only low pressure air could be used, involving inconvenience from bulk, and the loss of power in dealing with high-pressure air has been considered an insuperable barrier to its introduction. Colonel Beaumont claims to have got over this difficulty, and that, instead of the high pressure of the air that he uses being a source of loss, he has effected a positive gain. With regard to the financial aspect of the question, the cost of the traction of tramways by horses varies with the locality of the tramway, but taking the North Metropolitan line, upon which the invention is to be forthwith introduced, it is found that this company runs 4,000,000 miles a year, and the cost, including drivers, amounts approximately to 7¼d. per tram mile. Colonel Beaumont's company undertakes the traction of any tramway line with reasonable gradients at 6d. per tram mile, and has entered into a contract with the Leytonstone branch of the North Metropolitan line to draw their cars at that rate. In the experiments at Dukinfield the engine worked weighed 11 tons, and contained 100 cubic feet of air, which was pressed up to 1000 lbs. on the square inch. It drew an ordinary railway truck weighing between 5 and 6 tons, which is equal to the weight of the heaviest loaded tramcar. With this load the engine was kept running backwards and forwards for the space of 35 minutes on a siding in front of the works, at one end mounting a gradient of 1 in 40. The engine was started and stopped on the gradient with complete success; it was perfectly under control, and after running for the time named the pressure had only dropped to 650 lbs. After this the engine was coupled up to the compressors and recharged, the object being to show the facility with which the high-pressure air can be forced into the reservoirs and generally dealt with.

In practical working of large towns it is proposed to have on the outskirts, at such positions as might best suit the lines, fixed pumping stations, which would consist of a duplicate set of engines and compressors—to provide against the inconvenience of a possible breakdown—which would supply a sufficient amount of air to enable 500 miles per day to be run. The horse power necessary to effect this result would not exceed 60, and the consumption of coal would be 1½ ton only per day. The engine altogether promises to be a great success.

ELECTRIC LIGHTS.—Fair progress is being made with the introduction of the several systems. The Brush light is to be used from Blackfriars Bridge to Cheapside, and arrangements have just been completed with the British Electric Light Company for the experimental lighting of certain important parts of the General Post Office, St. Martin's-le-Grand. The first series of the experiments will be conducted in the telegraph instrument galleries.

PREVENTING INCRUSTATION.—Wheat bran is proposed by Messrs. ARNAUD, MOULET, and GINOYER, of Le Soleard, Aignes, both for preventing incrustation and cleansing boilers when incrustation has already taken place. They, in conjunction with Messrs. Blanc and Porte, of St. Etienne, have found about 2 lbs. of bran to each horse power of the boiler to be effective, and sufficient to serve for the space of about three weeks. The effect of this addition of bran is to prevent altogether any formation or incrustation upon the boilers, and also to remove incrustation upon boilers which have already been in use, and whether such incrustation has arisen from the use of fresh or of salt water. The bran may be introduced into the boiler either by hand through the man-hole, or elsewhere by the ordinary feed or other pump or injector, and by preference from a separate well or receptacle, in which the bran, along with water, is already placed. When the water in the boiler is fresh water a little salt or soda may be added.

WATSON BROTHERS' MINING CIRCULAR.

WATSON BROTHERS,

MINEOWNERS, STOCK AND SHARE DEALERS, &c

1, ST MICHAEL'S ALLEY, CORNHILL, LONDON.

The restrictions placed by the Government upon the manufacture, removal, storing, and carriage of dynamite are, we believe, among the chief causes of of its high price, and some strange stories may come out when the case for the renewal of the patent comes on; one or two we can vouch for. The manufacturer held one distinct license to make and another to sell dynamite. He made it, sold and delivered it, but not holding another distinct license to *deliver* it he was proceeded against for removing and delivering the very stuff he had a license to make and sell, and was fined 100*l*., which he paid, with heavy costs besides. Before the passing of the Act regulating these explosive materials he imported a quantity of nitroglycerine. After the passing of the Act he gave notice to the Home Secretary in pursuance of it that he had 1¾ ton in his possession. He was then granted a license to *hold it*, but was refused any order to sell or deal with it, and thus it remained in his possession for five years. Soon afterwards Mr. Lowe became Home Secretary, issued an order to revoke all licenses at the expiration of a month, and further gave notice that if he imported glycerine, or any part of it was then kept in possession, he would enforce the penalties of the Act of Parliament, which rendered the holder liable to a penalty of 500*l*. and 12 months' imprisonment with hard labour. The importer used every exertion to get a renewal of the license, but failed, and the day before his old one expired he sent the key of the magazine where the nitroglycerine was stored to the Home Secretary, together with a letter abandoning and surrendering the said nitroglycerine to him, and calling upon him as Home Secretary to make such order for the disposal of it as should seem fair and just. This prompt action seems to have startled Mr. Lowe, for it produced at once a fresh license to hold the stuff, and eventually another to convert it all into dynamite. Such, among many, were the early trials of the promoters of dynamite in this country, and many of them, including the heavy burdens on the manufacture, storage, and delivery of it, remain to this day.

The person who signs himself "Miner" in last week's Journal is evidently not much of a reader, or he would have observed that the remarks that so astonished him as *ours* were those of a correspondent. He is quite as much out or unfair in the second paragraph of his letter.

Our remarks of last week upon Great West Chiverton have brought us, among a great many applications for shares, one or two letters from agents who know the mine and have also asked for shares. One writes, "I am glad you have taken up the mine, because I believe it will do well. I have never seen prettier stuff come from a lode so shallow, and I believe that you will have a good lode. I hope that you will be able to spare me some shares. The lead contains, from a sample I had assayed, 11 ozs. of silver to the ton, and as it gets deeper it will get richer in silver." Another writes that driving the deep adit will not cost more than 12*l*. per month, so that the mine can be proved at a little cost, and he thinks a rich discovery may be made.

We understand that a few tons of tin have already been broken in the Good Luck lode at Prince of Wales, and that there are reserves there to keep the stamps going for years to come.

The agent writes us that the No. 6 level at D'Eresby Mountain is not yet up to the rich sump gone down from No. 5, and that he may have 2 or 3 yards further to drive to get under it. Of course the frost has stopped all dressing and surface operations.

Several of our correspondents this week are referred to page 60 of the *Mining Journal* of last week. In reply to others who ask for copies of "our Circular," and the price of subscription to it, we may state that we do not issue private circulars, and the information we give publicly from week to week can only be obtained from the columns of the *Mining Journal*.

PROVINCIAL STOCK AND SHARE MARKETS.

CORNISH MINE SHARE MARKET.—Messrs. ABBOTT and WICKETT, stock and share brokers, Redruth (Jan. 20), write:—Notwithstanding the drop in tin, and the reduction of 3*l*. in the tin standards, the share market has remained firm, and shares in the leading mines are higher than last week. Subjoined are the closing prices:—Blue Hills, 3¼ to 4; Carn Brea, 115 to 117; Cook's Kitchen, 11¼ to 11¾; Dolcoath, 57 to 57¼; East Pool, 33¾ to 34; Mellanear, 4½ to 5; North Busy, 2½ to 2¼; Pedn-an-drea, 2½ to 2¾; Pendarves United, 9 to 10; Santa Gertrude, 175 to 180; South Condurrow, 10⅝ to 11; South Crofty, 10 to 11; South Frances, 11¾ to 12; Tincroft, 20¼ to 20¾; West Basset, 14 to 14¼; West Peevor, 16 to 16½; West Frances, 11 to 11½; West Tolgus, 50 to 52; West Seton, 16 to 18; Wheal Agar, 5½ to 6; Wheal Basset, 5 to 5¼; Wheal Grenville, 10½ to 11; Wheal Kitty, 4 to 4¼; Wheal Peevor, 26½ to 27; Wheal Prussia, 1¾ to 2; Wheal Uny, 4¼ to 4½.

— Mr. S. J. DAVEY, mine sharedealer, Redruth (Jan. 20) writes:—Our market has been very quiet throughout the week. Prices have but little altered, and but a small business has been done. To-day the market is firm. The following are the closing prices:—Blue Hills, 3 to 3¼; Carn Brea, 114 to 116; Cook's Kitchen, 11 to 11½; Dolcoath, 57 to 57½; East Pool, 33¼ to 34¼; Killifreth, ⅛ to ⅜; Mellanear, 4¼ to 5; New Cook's Kitchen, 6 to 7; North Busy, 2 to 2¼; Pendarves United, 9 to 10; Penhalls, 1¾ to 2; Pedn-an-drea, 2½ to 2⅝; South Condurrow, 10¾ to 11; South Crofty, 9¾ to 10¼; South Frances, 11¾ to 11½; Tincroft, 20¼ to 20½; West Basset, 14 to 14⅛; West Frances, 11⅛ to 12; West Kitty, 2 to 2½; West Peevor, 16 to 16½; West Poldice, 3½ to 4; West Tolgus, 45 to 50; West Seton, 14 to 16; Wheal Agar, 5½ to 5¾; Wheal Basset, 5 to 5¾; Wheal Comford, 4¼ to 4½; Wheal Grenville, 10⅝ to 10⅞; Wheal Jane, ½ to ¾; Wheal Peevor, 26½ to 27¼; Wheal Kitty (St. Agnes), 4 to 4½; Wheal Prussia, 1½ to 2; Wheal Sisters, 2 to 2¼; Wheal Uny, 4¼ to 4½.

— Mr. J. H. REYNOLDS, stock and share broker, Redruth (Jan. 20), writes:—During the week the share market has been dull, business having been restricted in a great measure owing to the inclemency of the weather, coupled with a lower price for tin. The Cornish smelters have also lowered the standards 3s. per cwt. Subjoined are the closing prices:—Blue Hills, 3¼ to 3¼; Carn Brea, 114 to 116; Cook's Kitchen, 11¼ to 11¾; Dolcoath, 56⅞ to 57⅛; East Pool, 33½ to 34; Killifreth, ⅛ to ¼; Levant, 4 to 5; Marke Valley, 1½ to 1¾; Mellanear, 4¾ to 5¼; New Cook's Kitchen, 6½ to 7½; North Busy, 2 to 2⅛; North Herodsfoot, 10s. to 12s. 6d.; Pedn-an-drea, 2½ to 2⅝; Pendarves United, 9 to 10; Phœnix, 2¼ to 2½; Penhalls, 1¼ to 2; South Caradon, 60 to 65; South Condurrow, 10¾ to 11⅛; South Crofty, 9¾ to 10¼; South Frances, 11¼ to 11¾; Tincroft, 20¼ to 20½; Trugo, 1¼ to 1½; West Basset, 14 to 14½; West Frances, 11¾ to 11¾; West Peevor, 16 to 16½; West Poldice, 3½ to 4; West Seton, 17 to 18; West Tolgus, 50 to 55; Wheal Agar, 5½ to 6; Wheal Basset, 4½ to 5; Wheal Comford, 4 to 4½; Wheal Grenville, 10½ to 11; Wheal Jane, 10s. to 15s.; Wheal Jewell, 10s. to 15s.; Wheal Kitty, 4 to 4½; Wheal Peevor, 25¾ to 27¼; Wheal Prussia, 1¾ to 2; Wheal Uny, 4¾ to 4½. Cornish Bank shares 20*l*.

— Mr. JOHN CARTER, mine sharedealer, Camborne (Jan. 20), writes:—In consequence of the severity of the weather little business has been transacted in the Cornish mine share market during the week. Dolcoath shares have been dealt in at 57; East Pool, 33¾; Carn Brea, 112½ to 115; Tincroft, 20 to 20½. Pedn-an-drea has received more attention at 2½ to 2⅝; North Busy, 2 to 2¼; South Condurrow, 10½ to 10⅝; South Frances, 11¾ to 11⅝. Other shares are neglected. On the 17th inst. the tin standards were reduced 3s., and are now 86s. and 87s. Closing quotations herewith:—Blue Hills, 3 to 3¼; Carn Brea, 114 to 115; Cook's Kitchen, 11 to 11½; Dolcoath, 56¼ to 57¼; East Caradon, 1¾ to 2; East Pool, 33¾ to 34¼; Mellanear, 5 to 5¾; New Cook's Kitchen, 6½ to 6¾; North Busy, 2 to 2¼; Pedn-an-drea, 2½ to 2⅝; South Caradon, 65 to 67½; South Condurrow, 10½ to 10¾; South Crofty, 10 to 10½; South Frances, 11¾ to 11¾; Tincroft, 20 to 20½; West Basset, 14 to 14½; West Frances, 11 to 11½; West Peevor, 15¾ to 16¼; West Poldice, 3¾ to 4; West Tolgus, 45 to 50; West Seton, 14 to 15; Wheal Agar, 5½ to 5¾; Wheal Basset, 4¼ to 5; Wheal Grenville, 10¾ to 11; Wheal Jane, 12s. 6d. to 15s.; Wheal Peevor, 27 to 28; Wheal Kitty, 3½ to 4; Wheal Uny, 4½ to 4¾.

— Mr. M. W. BAWDEN, Liskeard (Jan. 20), writes:—The mining market has been dull and inactive, prices mostly being nominal. The inclemency of the weather during the week has nearly suspended all business. Subjoined are closing quotations:—Bedford United, 1⅞ to 2; Carn Brea, 113 to 115; Gunnislake (Clitters), 3½ to 3¾; Cook's Kitchen, 11½ to 12; Dolcoath, 56½ to 57; Drake Walls, 1½ to 1¾; Devon Consols, 15 to 15½; Devon United, 1½ to 1¾; East Caradon, 2 to 2⅛; East Crebor, ¾ to ⅞; East Herodsfoot, ⅛ to ⅜; East Pool, 33 to 33½; Gawton United, 1¼ to 1⅜; Glasgow Caradon, 1 to 1½; Herodsfoot, ¾ to ⅞; Hingston Down, 1⅜ to 1½; Marke Valley, 1⅞ to 2; New West Caradon, ⅝ to ¾; North Herodsfoot, ⅛ to ⅜; Old Gunnislake, ⅝ to ¾; Phœnix United, 2½ to 2¾; Prince of Wales, ⅞ to 1; South Caradon, 65 to 67½; South Crebor, 1⅛ to 1¼; South Frances, 11½ to 12; Tamar Silver-Lead, 1¾ to 1⅞; Tincroft, 20 to 20½; West Basset, 14 to 14½; West Caradon, 1¾ to 2; West Chiverton, 1 to 1⅛; West Crebor, ⅝ to ¾; West Mary Ann, 1 to 1⅛; West Phœnix, 1½ to 1¾; West Tolgus, 49 to 50; Wheal Agar, 6 to 6¼; Wheal Crebor, 4¼ to 4½; Wheal Hony and Trelawny, 2½ to 2¾; Wheal Kitty, 3¾ to 4; Wheal Jane, ¾ to ⅞; Wheal Peevor, 26 to 26½; Wheal Uny, 4⅜ to 4⅝.

MANCHESTER.—Messrs. JOSEPH R. and W. P. BAINES, sharebrokers, Queen's Chambers, Market-street (Jan. 20), write:—Business during the past week has continued to move briskly in shares of industrial undertakings; many such concerns which have for some time been neglected, and to all appearance entirely forgotten, having come into favour, whilst some fresh advances have also been marked in cases in which business has been passing regularly. The advance in the neglected shares strengthens the belief that the investing public are on the look-out for more remunerative, if more risky, channels of investment than have for some time back been accepted by them; and as better trade seems secured, low-priced securities with intrinsic value are picked up in anticipation of a rise in value consequent on their participation in the general improvement. Speculative stocks still droop—a condition which has been contributed to by the exceptionally severe weather. In most classes the alterations show a balance in favour of higher figures, but there are a few exceptions.

BANKS.—Though no heavy amount of business is reported in Bank shares, transactions marked are spread over a number of concerns, and prices realised are fully up to best lately obtained. The variations show no instance of decline, but the following are higher—Manchester and County, ¾; Parr's, 1; Manchester and Liverpool District, ⅜; Union Bank of Manchester, ½; Oldham Joint-Stock, ½; Bank of Liverpool, ½; and Consolidated, 1/16. Much surprise—and amongst those interested consternation—was occasioned on Monday last by the stoppage of the Southport and West Lancashire Banking Company (Limited), a company which commenced business in 1875 with a capital of 380,000*l*. odd, of which one half (5*l*. per share) has been called up. The directors state that owing to serious losses which they have sustained they have been compelled to suspend payment, but hope that with the confidence and assistance of the shareholders they will be able to recommence the business of the bank without serious loss. At an informal meeting of shareholders yesterday a committee was appointed to consider the state of affairs along with the directors, and report to a duly convened meeting of shareholders to be held on the 26th inst.

INSURANCE SHARES have not produced quite so many transactions as of late, but figures are still moving upward, except in marine shares, most of which show declines to a greater or less degree. Higher—Liverpool and London and Globe are ½; London and Staffordshire Fire, ⅛; Lancashire and Yorkshire Accident, 1/16; and Equitable Fire, ⅛. Lower—British and Foreign Marine, ½; Imperial Marine, ¾; Maritime, ¼; Thames and Mersey Marine, ⅛; and Lancashire, 1/16.

COAL, IRON, &C., AND MINING.—The interruption to work caused by the difficulty with the men touching the Employers' Liability Act had the effect of sending up some shares interested probably in the anticipation of the agitation, being the means of getting rid of old stocks, and the hope that it would inaugurate better prices. When this is noticed some little ease is apparent on the tidings to hand to-day that the strike is practically at an end, and work to be resumed. Apart from these influences—or part of them however—the changes in quotation are marked by a favour of advances, the only cases of decline being Ebbw Vale ¾, Browns ⅛, and Tharsis Sulphur and Copper ⅜, whilst enhanced values are established in a great number of cases, foremost amongst which are Chatterley Iron 2¾, Llynvi Tondu Coal and Iron 3½, A. Knowles and Sons 1, Darlington Iron 1¾, Sheepbridge Coal and Iron 1¾, Palmer's Shipbuilding ⅛, Chillington Ison ½, Cammell's ½, Parkgate Iron, &c., ⅜, and many others fractionally better.

COTTON SPINNING AND MANUFACTURING are rather quieter, but there is very little disposition shown by sellers to accept much under best figures lately marked, but as enquiry is rather slacker prices have not received any further strength as yet.—TELEGRAPHS, though quiet as regards transactions, have moved somewhat in quotations. Anglos of all issues are much lower, but Direct United States Cable are ⅜, Eastern ⅛, and Globe pref. ⅛ better.—CANALS show more movement than of late. Ashton and Oldham are 6, and Macclesfield are 2 higher, but not many dealings are reported,—CORPORATION STOCK, &c., continue to command full prices.—MISCELLANEOUS generally firm, and tendency to harden.

RAILWAYS pointed to lower values during the week, the severe weather causing operators for the rise to look for smaller traffics, and as stock was put on the market prices went down accordingly, Sheffield, A's, suffering most. Great Eastern are influenced by their 3 per cent. dividend, and 12,000*l*. surplus, which, though comparing against 2¾ per cent. and 5500*l*. carried forward at the same time last year, was disappointing, as buyers expected more. Caledonians are 2; South-Eastern, A, 1; North Stafford, 1¼; and Brighton, A, 4 lower, the new capital wanted by the last named acting very unfavourably. Others show an average fall of ½. In Canadians business has not been active, and Grand Trunk prices are 1 under last week, and Great Western 3/16. Americans have moved sharply, Oregon and California establishing an advance of 87. Philadelphia and Reading 1, having been as high as 34¾, Pennsylvania ½, and good business going on in Ohio and Mississippi, and New York and Lake Ontario, both of which have risen.

HULL.—Mr. W. FOWLER SUTTON, stock and share broker, St. Mary's Chambers (Jan. 20), writes:—There has been but little life in the stock markets this week, owing, in a great measure, to the exceptionally severe weather, and consequent expected effect on traffic. To-day, however, was seen a little better feeling all round, and with a more promising outlook. This may be expected to develope further. The Canadian markets are quiet, and very little business doing in them. American market strong, as was anticipated. Atlantics do not move, however, but it will doubtless be their turn soon. Foreign stocks steady, and without material change, except a sharp rise during the week in Mexicans. Local stocks firm. Hull Banks, 12¼; Yorkshire ditto, 24; London and Yorkshire ditto, 32s. 6d.; Hull Trams, 9½; Earle's Ship Building, 20½; Hull Gas, 54; Hull and Barnsley allotments, 1/16 to ⅛ prem.

SCOTCH MINING AND INDUSTRIAL COMPANIES SHARE MARKETS.

STIRLING.—Mr. J. GRANT MACLEAN, sharebroker and ironbroker (Jan. 20) writes:—During the past week markets have continued quiet, caution being displayed, owing to the upward tendency in the money market; and the inclement weather also restricted business. Hope is still generally entertained of the trade of the country assuming a better condition, consequently the decline in prices may be temporary, and the recovery may be signalled by the desired improvement in the weather.

In shares of coal, iron, and steel companies the movements for the week comprise advances of 10s. per share on Nant-y-Glo and Blaina (pref.), 6s. 3d. on Chillington Iron, 5s. 6d. on Clyde Coal, 1s. 3d. on Monkland (pref.) and Steel Company of Scotland, 1s. on Monkland, and 6d. on Benhars; but Lochore and Capledrae, also Scottish Australian, are each reduced 2s. 6d. per share, Omoa and Cleland 2s. and Marbella 6d. In the pig iron warrant market prices have been steady, between 52s. 5d. to 53s. 8d. Although stocks are increasing makers are all raising their prices, which shows that trade is good and steady. A good demand is reported from the Continent and the United States, and the Scotch miners are again beginning to agitate for increase of wages. Benhars have been done at 8s. 6d. to 9s. The meeting of the Rhymny is to be held on Jan. 21. Chapel House (debentures), offered; Andrew Knowles and Son are at 12 dis.; Antrim Ore, 46s.; Bilbao Iron, 32½; Bilson and Crump, 60s.; Bagworth Colliery, 70s.; Bolckow, Vaughan, 25s.; ditto (pref.), 21½; ditto (12*l*. paid), 5½ prem.; Cardiff and Swansea, 32s.; Chapel House Colliery, 30s.; Charles Cammell and Company, 7 dis.; Chillington Iron, 85s. to 90s.; Clyde Coal, 92s. to 93s.; Chatterley Iron, 9½ to 10; Darlington Iron, 13½ dis.; Ebbw Vale, 7½ dis.; Glasgow Port Washington, 160s.; Henry Briggs, A, 11½; John Bagnell and Sons, 22s. 6d.; John Brown and Co., 12¼ dis.; Lofthouse Colliery, 65s.; Llynvi and Tondu, 12½ to 13; ditto (pref.), 10 prem.; Marbella, 86s. to 88s.; Mersey Steel, 45s. dis.; Monkland Iron, 56s. 6d. to 57s. 6d.; ditto (pref.), 5*l*. 16s. 3d. to 5*l*. 16s. 9d.; Muntz's Metal, 13¾; Newport Abercarn, 7¼; Nant-y-Glo and Blaina (pref.), 41; New Sharleston Colliery (pref.), 90s. to 100s.; Oakham Colliery (pref.), 55s.; Omoa and Cleland, 35s.; Parkgate Iron, 35s. prem.; Pelsall Coal and Iron, 5¾; Sandwell Park Colliery, 16¼; Scottish Australian, 20s. to 25s.; Sheepbridge Iron, 20¼ dis.; South Wales Colliery, 45s.; Steel Company of Scotland, 11¾; Teeside Iron and Engine, 60s.; ditto (pref.), 2s. 16d. prem.; Thorps Gawber Hall, 20s.; Tredegar, A, 7 dis.; West Cumberland, 9 dis.; also Wigan and Whiston, 80s.

In shares of foreign copper and lead companies, Panulcillos have advanced 3s. 9d. per share, but Rio Tinto are reduced 10s., Tharsis 1s. 3d., also Canadian and Huntington each 6d. Copiapo are at 15¼; Canadian, 42s. to 44s.; Huntington, 66s. to 67s.; New Quebrada, 6¾; Panulcillo, 6*l*. 2s. 6d. to 6*l*. 3s. 9d.; Rio Tinto Five Per Cent., 98⅛; Virneberg, 30s. to 40s.; and Yorke Peninsula, 5s. to 7s. 6d.

In shares of home mines business continues dull, owing to the drooping tendency of the metal markets. Glasgow Caradons are easier at 25s. to 26s., and the new shares have been done at 17s. The Great Laxey quarterly dividend of 6s. per share is payable on January 26. The Kit Hill Great Consols Company has been formed, with a capital of 50,000*l*., in 2*l*. shares, to work properties of the same name in Cornwall. Bedford United are 32s. to 37s. 6d.; Berehaven, 4s.; Blaen Caelan, 22s. 6d.; Bwlch United, 25s. to 30s.; Carn Brea, 115; Carn Camborne, 55s.; Devon Great United, 50s.; Devon Great Consols, 16; Dolcoath, 57; East Pool, 34; East Lovell, 90s.; East Long Rake, 22s. 6d.; East Devon Consols, 50s.; East Chiverton, 22s. 6d.; East Roman Gravels, 10s. to 15s.; Great Consols, 20s.; Herodsfoot, 12s. 6d. to 17s. 6d.; Hingston Down, 30s.; Indian Queen, 30s. to 40s.; Killifreth, 5s. to 7s. 6d.; Lovell, 30s.; Marke Valley, 35s.; Mining Company of Ireland, 61s. 3d.; New Kitty, 30s.; North Busy, 42s. 6d.; North D'Eresby, 25s.; Okel Tor, 30s.; Parka Mines, 30s. to 40s.; Pant-y-Mwyn, 20s. to 30s.; Pennant, 60s.; Pandora, 10s. to 15s.; Prince of Wales, 17s. 6d. to 20s.; Roman Gravels, 10 to 10½; South Crebor, 25s. to 30s.; South Darren, 40s. to 50s.; South D'Eresby, 16s.; South Frances, 11½; Tamar, 25s.; Tincroft, 20½; Tin Hill, 30s.; Tretall, 21s.; Trevince Consols, 25s.; Ystwith, 25s.; West Crebor, 10s. to 12s. 6d.; West Kitty, 32s. to 37s. 6d.; West Pateley Bridge, 20s. to 30s.; West Phœnix, 37s. 6d. to 42s. 6d.; West Holway, 27s. 6d.; Wicklow Copper, 5s. to 7s. 6d.; Wheal Jane, 12s. 6d. to 15s.; Wheal Coates, 25s.; Wheal Grenville, 10½; Wheal Kitty, 4¼; and Wheal Peevor, 28.

In shares of gold and silver mines there is no particular alteration to notice, Richmonds are 2s. 6d. higher, at 16¾ to 17: this week's run is not announced yet, no doubt owing to the block in the American wires. Steps are said to be being taken to make the Indiam Mammoth directors return the subscribed capital. Flavillas unaltered. Almadas are at 7s. 9d. to 10s.; Australian Mines, 5s.; Cherambadi (Wynaad), 20s.; Cedar Creek, 3s. to 5s.; Callao Bis, 27s. 6d. to 30s.; Colorado, 55s.; Devala Provident, 2s. 6d. to 5s.; Eberhardt, 70s.; Emma, 72s. 6d.; Exchequer, 6s. 3d.; Flagtaff, 32s. 6d.; Frontins, 5; Gold Runs, 5s.; Gold Coast, 6s. to 8s.; Indian Glenrock, 33s; Javali, 4s. 6d. to 5s. 6d.; Kapangas, 10s. to 12s. 6d.; La Plata, 41s. 3d.; Mysore, 25s.; Nava de Jadraque, 15s.; Rhodes Reef, 1s. 3d. dis.; Ruby, 6¼; South East Wynaad, 36s. 3d.; St. John del Rey, 240; South Indian, 42s. 6d.; Tecona, 5s. to 10s.

In shares of oil companies Oakbank are 1s. per share higher, but Uphall 2s. 6d.

lower. Young's Paraffin steady at 12⅝ to 12¾; North Monkland Oil and Coal shares offered.

In shares of Miscellaneous Companies business continues quiet. The meeting of the United States Rolling-Stock will be on Feb. 1. Cheshire Salt are at 6½. Earle's Shipbuilding, 14¼ dis.; Flintshire Oil and Cannel, 40 dis.; India Rubber, 17*l.* 16s. 3d.; Milner's, 9¾ to 10; Palmer's Shipbuilding (B), 5 dis.; and Zoedone, 42s. 6d. Prices of chemical Companies shares are: Gaux Manure, 21s.; Langdales, 60s.; Lawes, 5½ to 6; Newcastle, 50s. to 60s.

EAST HERODSFOOT.—The last miners who worked in this mine are sanguine it must prove a success, and the work is now in a forward state for showing the lode which was cut south of the cross-course, where a good course of ore is said to exist entering a hill 250 ft. high above the adit level, where the lode is seen. The lode south of the said cross-course is estimated worth 3 tons to the fathom in a stope of rich silver-lead ore. The property is situated near Liskeard, and very convenient, therefore, for inspection by agents of any intending shareholders, who, in this case, do not require to rely on interested statements, but can verify the value of the property for themselves.

EDINBURGH.—Messrs. THOMAS MILLER and SONS, stock and share brokers, Princes-street (Jan. 20) write:—The railway market has been depressed during the past week, Caledonian has receded from 114½ to 111⅜, North British from 93½ to 92, Great North of Scotland from 69⅜ to 68¾. Highland has remained steady at 107½. Preference, guaranteed, and debenture stocks have maintained their price in nearly every case. Bank stocks have been well supported. National has risen from 272 to 272½, Clydesdale from 215 to 218. Insuranee shares have in some cases gone to still higher prices. Mining shares are very little altered. The shares of some of the local property companies have been further depressed on a statement issued by one of these companies showing that some temporary forbearance will be necessary on the part of the depositors, and stating that the register of shareholders has been closed for the present.

IRISH MINING AND MISCELLANEOUS COMPANIES' SHARE MARKET.

CORK.—Messrs. J. H. CARROLL and SONS, stock and sharebrokers, South Mall (Jan. 19), write:—Markets remain dull all round. Great Southerns have been done at 115½, and Midlands at 89¾. Bandons steady, at 92, and Macrooms asked for at 6. National Bank good at 68½, on dividend announced at 11 per cent. Munsters dullish, at 7⅛ to 7¼. Provincials remain 57½, and Hibernians 44½. Cork Steam Packets have fallen at 13. Lyons shares asked for at 5⅛, and Gouldings at 9⅛. Levys offered at 6, and Gas shares at 7½. Harbour Board Debentures are 102½ per cent.

THE WEEK.

SATURDAY, JAN. 15.—The pressure of a few sales made Brighton, A, tumble to pieces; the last price was 142, a fall of nearly 3*l.* Sheffield, A, receded 1¼, and the stock is now but 57; quite high enough, considering there is no dividend, nor likely to be one. Reading shares opened at 835, but the dealers here finding that New York selling was attempted depressed the price to 833¼, showing no change for the day. Illinois Central continue to be neglected, and are now but $123½, having fallen from $132. Very little, indeed, was done in Mexican, the closing prices being 25 and 15¼. Turks rose on buying from the Continent to 13¼.

MONDAY.—Several of the markets were in a state of partial collapse. A 3 per cent. dividend announced by the Great Eastern only served to knock down the price 2 per cent. Severe fluctuations ruled in Mexican; after opening at 25*l.*, stock was pressed so rapidly for sale on an unwilling market that 22*l.* was reached, followed by a recovery to 24*l.* Mexican (new) closed 1¾ lower. Reading shares receded to 31¾, and the premium on the new issue declined to 1½.

TUESDAY.—A fearful snow storm such as is not often seen in a liftime raged all day in the City, and business was partially suspended. Railways were offered all round, the last price for Brighton, A, being 140¾. The American buying of Mexican was resumed, and the 1851 Bonds reached 27, a difference of 5*l.* from the lowest of yesterday. Mexican, New, recovered from 13½ to 15¼. Everything else in the foreign market was totally neglected. After a long period of neglect Illinois were in active request, advancing 4½. Readings remain at 831¾, and Pennsylvanias at 868.

WEDNESDAY.—Illinois Central were dealt in at over 8136, and closed very firm. We have already stated that they "deserve attention," and since Saturday they have repaid attention by a rise of nearly 7 per cent. Reading shares once more reached 833, and the premium on the new issue rose to 2¾. Prices of home railways were again pushed down by the extraordinary severity of the weather, Brighton, A, could be bought at 140. North-Eastern are once more 176¼, Friday's jump of 2*l.* having now quite disappeared. Mexican lost ⅜ on yesterday's rise.

THURSDAY.—The report of the London and Westminster Bank shows a net profit of 196,345*l.*, and a dividend of 9 per cent. for the half-year upon the paid-up capital of 2,000,000*l.* has been declared. On the first and second instalments of the new shares 5 per cent. interest will be paid. The rest or surplus fund is now a little over 1,045,000*l.* The 100*l.* shares with 20*l.* paid were to-day dealt in at 67½, anyone, therefore, buying now gets uncommonly little interest for his money. It has been mentioned that all the losses made during the past year would be covered by 40*l.*; almost incredible. A few enquiries have prevailed for Devala Moyar shares. The agent advises that the prospects were never so bright as now, and he advises great caution in leasing estates, as labour might be interfered with, and serious losses caused. Many ancient workings undisturbed from the 17th century are now as busy as ant hills. To-day Illinois could be sold at 8138. Unified could be bought at 70½, and Turks at 12¾. Mexican slightly receded.

FRIDAY (*Opening*).—Mexican are somewhat lower, the old being offered at 25, and the new at 15. Unified and Turks are ⅛ better, being 70½ and 13 respectively. Readings are 32½ to 32¾. Great Eastern, 69 to 69¼. Sheffield, A, 56⅜ to 56⅝. Caledonian, 111¼ to 111½. Trunk (ordinary), 23⅝ to 23⅞; First Preference, 101¼ to 101½; Second Preference, 93¼ to 94; Third Preference, 47⅛ to 47⅜. Bedford United, 1¾ to 2¼; call of 2s. paid. East Lovell, 4½ to 5; call of 15s. paid. Wheal Crebor, 4 to 4½. Parys Copper Corporation, ⅞ to 1. Prince of Wales, 17s. to 19s. Devon Great Consols, 15 to 16. Dressing must now of necessity be suspended at most mines.—*Two o'clock.*—Mexican have rallied considerably, and are now 26¼, which is ⅜ better than yesterday. New York Central are 8157, and Illinois Central 8137; Readings being 832½; Brighton, A, 140½ to 140¾; Caledonian, 111¼ to 111½; while Turks are now but 12⅜ to 12⅞. —*Four o'clock.*—It being reported that the Chilians have captured Lima, Peruvians are active, and higher, the Fives being 21, and the others 24½, a rise of nearly 1*l.* in each case. Unified have receded to 70¼, a price now seen for some little time. Railways are all neglected, but no important fall has taken place. Devala, 1¾ to 1⅞. La Plata, 1⅞ to 2. Richmond, 16⅝ to 16⅞. Ruby and Dunderberg, 6 to 6¼. Nouveau Monde, 1½ to 1⅝. New Quebrada, 6½ to 6¾.

FERDINAND R. KIRK.

EAST LONG RAKE—SPECIAL REPORT.

Jan. 14.—I beg to hand you my report of the East Long Rake Mine. This property is situated on the Halkyn Mountain, which is noted for its abundance of lead ore. There are several lodes, which traverse the whole length of the sett, which is somewhat extensive. East Long Rake Mine is surrounded by mines which have paid many hundreds of thousands in dividends to the shareholders. There is a good substantial shaft 60 fms. from surface, which is well timbered, sufficiently large for winding, and good ladder way, which is now fixed to the 50 fm. level. This shaft has been sunk on the celebrated Long Rake lode to the 50 fm. level; the last 10 fms. sunk from the 50 to the 60 is south of the lode, thus leaving the last 10 fms. unworked. I consider a cross-cut from the 60 about 10 or 12 ft. would reach the lode, where you will have 10 fms. of good ore bearing ground to stope away, besides the advantage of driving both east and west on the course of the lode. This I consider desirable to do at once for several reasons. One is you would be opening out a very profitable piece of ground. The next point of operation to which my attention was called was a cross-cut driven south about 40 fms. to intersect the Gin lode. From calculations made there is about 4 fms. or so to drive to reach this point, where good ore may be expected. This lode has been worked as low as the 20 fm. level, and must have produced large quantities of ore. This is evident from the ground stoped away by the former workers. Should this lode prove so rich for ore at the 50 fm. level as anticipated, of which there is but very little doubt, you will have 40 fms. of good backs to stope away, and can drive both east and west on the course of the lode, which goes the entire length of the sett. It is also known that there is another lode existing but a few fathoms beyond this Gin lode, which has produced good ore at a shallow depth; comparatively speaking but little has been done on this lode. The next point of operation I noticed was 5 fms. from the entrance to the cross-cut referred to an east and west lode known as the middle lode was intersected; there is only about 6 ft. driven west, and 15 fms. east—it is a strong masterly lode, and well defined, intermixed throughout with lead ore of a nice quality.

While examining the stuff broken in my presence I found it to be good orey stuff for washing. This 15 fms. east had been driven by some poor men, who worked the mine for themselves for many years, and made a good living out of it; it is also known that men working in this way only drive very small levels; in fact, this level was so small that it was utterly impossible for men to do any fair amount of labour. I was much pleased to see that you are now making the level wider and taking up the lost level, which will make it sufficiently high so that men can do their work with more ease and at much less expense per fathom. There is about 3 or 4 fms. to take away to reach the forebreast, when I would advise you to drive this level east 15 fms., where you will intersect the Wagstaff lode, which has produced large quantities of ore, and I have information from good authority that there is now good ore in the bottom of that mine. This lode being of a porous nature will take all the water from yours, and will relieve you of having to obtain powerful pumping machinery, which would mean a heavy draw on your capital. I may also say that in the back of your east level there is a stope gone up for 4 fms., where the men were breaking some good ore; but the stope, like the level, was very narrow, the whole of the lode not having been worked away, and I noticed on both sides of the stope and level large patches of lead ore; there is also a small sump in the bottom of level about 4 fms. deep, in which there is good ore, thus proving that the ore goes down. In conclusion I may say that I have inspected many mines in Wales and elsewhere, but on no one occasion have I seen so many places in one mine worthy of being prosecuted with vigour, lead ore being in every part except one, and, as I have stated above, in this one there is only 4 fms. 3 ft. of dsad ground to drive. I may say that so far as you have gone all your workings have been securely and efficiently done, and with a small capital, judiciously laid out, you have every reason to anticipate a great and lasting success, your position and requirements being equal to any of the most productive mines in the county. I shall esteem it is a pleasure to give you any further information which I may be able to do at any future time.—JOHN WOOLCOCK, M.E.

P.S.—I have such confidence in the property that if I had the means I would not hesitate in taking up 1000 shares in the concern without the least fear of losing one shilling, but on the contrary I should expect at least 30 or 40 per cent. for my outlay.

Meetings of Public Companies.

INDIAN GLENROCK GOLD MINING COMPANY.

The ordinary general meeting of shareholders was held at the Guildhall Tavern, Gresham-street, on Thursday, under the presidency of Colonel S. L. HOWARD.

The notice convening the meeting having been read, the report and accounts were taken as read.

The CHAIRMAN said that the meeting would have been held later; but as it was necessary to hold an extraordinary meeting at once it was felt by the directors that it would be a pity to bring the shareholders together a second time on purely formal business. This being, with the exception of the statutory meeting, the first meeting at which the directors had had the pleasure of meeting the shareholders, it might be pleasant to them to know something of what had been going on. They had, of course, as one of the three pioneer companies, had many difficulties to contend with in commencing new operations in a place like India, especially in getting together labour and in getting up materials required to the property. In the first few months of their operations progress was extremely slow, for there were no tools, and nothing was to be got in the neighbourhood, or, indeed, in India at all, for mining was new industry there; and though they had tools which were serviceable for surface work, they had none applicable for working a mine, and everything had to be sent out there. So valuable, indeed, were these tools that on more than one occasion some of them had gone astray, and had been seized upon by some of their neighbours, who were in want of such things, and preferred taking them away rather than waiting until their own came up. There had been some difficulty in tracing them, but they were on the track of them, and the articles would be paid for all right. They had also had some difficulty in Glenrock, owing to the soft nature of the ground. The ancient miners in their operations turned over immense masses of soil, and this soil, even in the course of ages, had not attained the solidity of natural soil, and they had been obliged to drive under it in broken ground, and with the aid of native miners, who had a great dread of underground work, unless they knew it to be perfectly safe. This had given them great difficulty, and they could not send out a large staff of English miners until they had got bungalows put up for them. These had now been erected, and a very strong staff of men were at the mine, while the native miners were getting increased confidence, and they were hoping to make much greater progress than they had yet been able to do. (Cheers.) The directors had sent out 40 heads of stamps, and the necessary machinery, but they were kept at Calicut waiting for the Government to improve the roads and strengthen the bridges over the Ghaut to enable them to bear the weight of the machiney, and this was being done as rapidly as possible. The stamps sent out were of the very best construction. Mr. Noah Coward, an experienced gold miner, had been sent out, and Mr. Syson, who had been doing excellent work, would now devote his time to his more proper work of surveying. A very competent engineer, who had had great experience in Australia and in the Argentine Republic, had also been sent out for the purpose of prospecting with the view of discovering new reefs, which might still exist in the jungle, until the arrival of the machinery at the mines, when he would assist the engineers in putting it up. A powerful saw-mill had also been sent out to utilise some of the timber with which their property abounded. (Cheers.) The directors believed the property to be second to none in the neighbourhood —(cheers)—not only because of its intrinsic value but because of the economy with which it could be worked. He then moved the adoption of the report and balance-sheet. (Cheers.)——Mr. R. P. HARDING seconded the motion.

Mr. WILLIAM ABBOTT did not rise with any intention of opposing the resolution which had been moved; but he thought it was only right that he should make a few remarks with reference to this property and the present position of the company. It would be remembered that when the company was first floated he had a great deal to do. All kinds of remarks were made and circulated that the price paid for the property was excessive, and that they were engaged in an entirely visionary enterprise, which, like many which had preceded it, would prove abortive. They were met to-day to sanction a resolution to increase the capital by 40,000*l.*, to turn what they already held as a leasehold into a freehold property. (Hear, hear.) He need hardly tell shareholders that this resolution would have his most hearty support; but it must be particularly satisfactory to those gentlemen who had held on to their property to know that not only had their shares increased in value, but the property which those shares represented had, owing to subsequent events, increased enormously in value, and he most unhesitatingly maintained that the price at which their shares stood at the present time was no fair criterion whatever as to the real intrinsic value of the property. (Hear, hear.) What they subscribed 100,000*l.* for was now worth considerably more than 150,000*l.*; but it must be remembered that 50,000*l.* of the 100,000*l.* remained in the balance-sheet as cash in hand. The directors must not consider this as an investment company, but they must do everything possible to develop the property with all the energy of which they were capable. (Cheers.) He was glad to hear that the machinery was out, and he hoped the Chairman would be able to tell them when it was likely to be put up and be in full work. (Hear, hear.) No doubt a vast amount of useful work had been done in anticipation of the arrival of the machinery, as they learned from the report sent by their very able manager. He could quite foresee that there would be a great demand for some portion of their property, but he protested against their doing what had been done in some other cases, though the sale of a reef or two might give the shares a spasmodic advance in the market. (Cheers.) They had another very great security, that they were surrounded by the Indian Gold Mining Company of Glasgow, the South Indian Company, the Indian Phœnix, and other companies, in which about 300,000*l.* to 400,000*l.* had been subscribed, and it was to be hoped that the managers of those various companies would form a sort of constant committees for the protection of the interests of their shareholders. (Cheers.)

The report and accounts were unanimously adopted.

Mr. HUMPHREYS proposed the re-election of the retiring directors—Colonel Howard and General Ray.——Mr. WM. ABBOTT seconded the proposition, which was carried unanimously.

On the motion of Mr. WM. ABBOTT, seconded by a SHAREHOLDER, Mr. John Smith was re-appointed auditor of the company

The meeting was then constituted special, and the notice convening it was read.

The CHAIRMAN said that the shareholders were well aware that the original vendors of the property only succeeded in purchasing the mining rights, with the privileges connected with the use of the water, but they had no right to the use of the timber, and they were subject to the usual clauses as to the damage done by mining. The extent of the property was 3150 acres, and it was proposed to buy for 35,000*l.* the whole of the surface rights, including bungalows, timber, coffee, cinchona, timber, and everything else on the property. The property would then stand them in at 26*l.* per acre, and, with one exception, would be the cheapest purchase made in the Wynaad district. Having compared their price with the amount paid for other properties in the district, the Chairman drew particular attention to the highly valuable character of the timber if possessed by the company, and said they had proxies from the holders of 52,000 out of 100,000 shares. The Chairman then introduced Mr. Jeremiah Ryan, one of the vendors, to the meeting.

A SHAREHOLDER asked when the stamps were likely to be at work?——The CHAIRMAN said that the foundation for the stamps had been put in, but when they were got up depended entirely upon the Government putting the roads in good order.

A SHAREHOLDER asked whether any of the other companies would get their stamps up before this company?——The CHAIRMAN said there was not the slightest chance of others being up first; this company would have their stamps up as early as a company would started 12 months earlier.

The CHAIRMAN said a large portion was dense forest, which was of enormous value for mining purposes. There was a certain quantity of coffee, which the directors were negociating to have taken over by independent persons. The cultivation of coffee had been estimated to be worth 1500*l.* per year.

Mr. J. RYAN said the company would possess about 1000 acres of forest; he believed it was only a matter of three or four years before the neighbouring mines would have to come to their company for timber. (Hear, hear.) The foot of man had had never penetrated some portion of the forest. Some of the spars were worth 25*l.* to 30*l.* each on the coast. There was also a large quantity of black wood and rosewood, which he need not tell them was extremely valuable, the latter being sold by weight. He could not estimate the prospective value of the property, but he believed the company would recoup themselves three or four times from the forest alone. In addition to the coffee which had been alluded to there were 22,000 cinchona trees, from which a revenue would be derived at the end of three or four years, when it was estimated they would yield an average of 2s. per tree, and return a very handsome profit. He had the pleasure of conducting the negociations for the sale of this property on behalf of himself and partners, and from the first stimulated for a permanent interest in the undertaking, and that he should be paid a percentage of the profits; and he could only say he intended to retain his interest in the property, and should recommend all his partners to do the same. (Cheers.) He did this because he felt that otherwise he might be parting with untold wealth. He was sure there was no shareholder present who would ever regret what he had put into this company. (Cheers.)

The CHAIRMAN, in reply to Mr. HOGARTH, said the title to the property was as perfect as anything could be in this world. It had been investigated by the Government solicitors, and there was every reason to be satisfied with it. He (the Chairman) then formally moved—"That the agreement dated the 24th of December, 1880, between Jeremiah Ryan, on the first part, and Leander Miller, on the second part, and the company, on the third part, now produced, for the purchase of the surface of the land under which the mining rights of the company extend, for the sum of 35,000*l.*, payable as to 15,000*l.* in cash and as to 20,000*l.* in fully paid-up shares, the vendors releasing their existing rights to 10 per cent. of the profits of the company, be, and the same is hereby, confirmed."

Mr. HARDING, in seconding the motion, said it had been a difficult task to negociate for the property with Mr. Ryan, who was a thorough man of business, but he believed the company had obtained the property on very excellent and favourable terms. (Hear, hear.)

Mr. J. RYAN, in reply to an observation by Mr. W. ABBOTT, said there was every reason to believe that the gold of Ophir, mentioned in Biblical records, came from this district, and Mr. Eastwick had calculated that 160,000,000*l.* worth of gold had been taken from it. He went at some length into the work which had been done in the district in past times, and went on to say that he wished well to all the South Indian Mining Companies. As regarded the quality of the gold, taking Mr. Brough Smyth's report of analysis for 50 typical sections, he noticed that the highest gave 204 ozs. of gold per ton, and the lowest 1½ dwt., and the average of the whole samples came out a little over 3 ozs. per ton. If they could only get as much as 10 dwts. per ton that would return a dividend of 35 per cent. on 100,000*l.*

The CHAIRMAN said he might mention that the directors were anxious to work most harmoniously with all their neighbours. He was in a position to fully corroborate a great deal that Mr. Ryan had said about the value of Indian Glen Rock; in fact, on his recent return from India he made a remark that it was likely to prove "real jam."

The resolution was then put to the meeting and carried unanimously.

On the motion of the CHAIRMAN, seconded by Gen. WRAY, it was resolved that the capital of the company be increased by the sum of 40,000*l.*, divided into 40,000 shares of 1*l.* each.

On the motion of Mr. W. ABBOTT, seconded by Mr. STAPLES, a vote of thanks was passed to the Chairman and directors, and the meeting broke up.

COPIAPO MINING COMPANY.

A special general meeting of shareholders was held at the offices of the company, New Broad-street, on Monday (Mr. J. D. Fletcher presiding), for the purpose of considering the following resolutions, with a view of having the same passed and confirmed at a subsequent general meeting as special resolutions under the Companies' Act 1862:—

1.—That the existing shares of the company be and the same are hereby subdivided into 50,000 shares of 4*l.* each, provided that the proportion between the amount which is paid and the amount which is unpaid on each share of 4*l.* shall be the same as it was in the case of the existing share from which it is derived.

2.—That the first clause or paragraph under the head of "Votes of Shareholders" in the Articles of Association be and the same is hereby abrogated, and the following article be and the same is hereby substituted for the same:—"Every shareholder shall have one vote for every complete number of 10 shares held by him up to a total completed number of 500 shares, but no shareholder shall have any vote for any fractional number of 10 shares, and no shareholder shall have more than 50 votes in all."

The CHAIRMAN formally moved the adoption of the first resolution, which was duly seconded.

A SHAREHOLDER suggested that, although the first resolution was, no doubt, expressed in proper legal language, still it was scarcely sufficiently explanatory for shareholders who did not understand these things, and said he thought the language of the resolution might be altered, so as to render the meaning of what was being done more clear to the comprehension of the shareholders.

Mr. SCHOFIELD and some of the other shareholders concurred, and in the end the following amendment was passed, first as an amendment and afterwards as a substantive resolution:—"That the existing shares of the company be and the same are hereby subdivided into 50,000 shares of 4*l.* each, on which 3*l.* 8s. shall be considered to have been paid, leaving a liability of 12s. per 4*l.* share, such liability being in the same proportion as the liability on the original 20*l.* shares."

On the motion of the CHAIRMAN, seconded by Mr. WEIR, the second resolution, given above, was also put and carried.

A short discussion ensued as to whether the forthcoming dividend shall be paid on the existing shares or on the subdivided shares, and in the end it was decided that the dividend shall be paid on the subdivided shares.

The CHAIRMAN, in reply to a question, said the latest advices from all parts of the mine were extremely satisfactory.

On the motion of Mr. SCHOFIELD a vote of thanks was passed to the Chairman, and the meeting broke up.

ISABELLE GOLD MINING COMPANY.

A special meeting of shareholders was held at the City Terminus Hotel, Cannon-street, on Monday,

The Right Hon. the Earl POULET in the chair.

The CHAIRMAN said the meeting was a private one of his own, called as he thought it very necessary that the shareholders should know of the very serious matter that had occurred in the direction of the company, and it would have been called earlier, but it was thought that Mr. Lewis Chalmers, the superintendent of the mine, would have been able to have been present at the ordinary meeting of the company. At the latter end of the year 1879 Mr. Leeming, who was a director, proposed to bring on to the board Mr. George Denton, and after some little opposition that gentleman (who subsequently changed his name to Mr. George Denton Cardew) was elected to a seat at the board. In the month of February, 1880, Mr. Romayne was elected a member of the board, to which he was a very valuable acquisition, having previously been out to California and examined for himself the three properties—the Isabelle, I.X.L., and Exchequer—in the companies's working, in which he became a very large shareholder. In the course of last summer Mr. Cardew and Mr. Leeming proposed that the company should purchase a machine introduced by Capt. Penrice; but Mr. Romayne said he thought it would be a pity to send out this machine, which had never been tried. There was a long discussion on the matter, and the votes were evenly divided at the board meeting, but to insure having a majority at the next meeting they sent over to France to Mr. Dunn, the other director, who had gone on the Continent for the benefit of his health. Mr. Cardew then suddenly made a proposition to elect Capt. Marcuard, Mr. Buckingham, and Mr. Baxter to seats at the board. This was done without any notice to the other members of the board, and was certainly a very improper and uncourteous way of doing things—(hear, hear)—though of course he had no personal objection to either of the gentlemen proposed. On Aug. 24, 1880, the gentlemen named were elected by the majority of the board, and a resolution was also passed, without any previous notice, that Mr. Cardew should go out to the mine to report generally on the state of affairs and consult with Mr. Lewis Chalmers as to the financial requirements of the company. This resolution was, he (the Chairman) considered, quite illegal, for Mr. Cardew could not vote for himself, and Messrs. Dunn and Leeming could not make up a quorum. They also illegally, gave Mr. Cardew a power of attorney to represent the company. He believed that 10 shares were transferred to Capt. Marcuard and Mr. Buckingham from Mr. Cardew's account to make them eligible for seats at the board. (Laughter.) Mr. Romayne objected to this—("Of course")—and immediately sent in his resignation—a resolve which no doubt pleased his opponents. The Chairman then read an extract from a letter from Mr. Chalmers, in which it was stated that Mr. Cardew told the writer he wanted to give the shares a fillip on behalf of his client—Messrs. Leeming and Dunn, and that as Mr. Romayne was too tight-laced he (Mr. Cardew) had got rid of him—Mr. Romayne having in reality resigned of his own accord—that Mr. Syme was impracticable and dogged, and that he held too many vendors' shares. The gentlemen were elected to the board at the next meeting, but Mr. Baxter subsequently resigned. Mr. Cardew started for the mine about the beginning of September, but though he might have reached there in about three weeks it was two months before he arrived. He (the Chairman) contended that Mr. Cardew went out solely in the interest of Mr. Leeming and Mr. Dunn, for there was no necessity for his going out on behalf of the company. He corresponded with Mr. Leeming, but did not send any information to the board. He (the Chairman) wished to arrange to forward the monthly money to Mr. Lewis Chalmers, and asked Mr. Leeming, who was in arrear of calls on his shares to the extent of about 280*l.*, if he would pay in what was required for him, but Mr. Leeming replied that Mr. Cardew had telegraphed to him to say that no money was required as there was plenty at the bank. The directors, however, did not receive any telegram to this effect, nor were they shown that which Mr. Leeming had received. Shortly after that Mr. L. Chalmers telegraphed that the miners were mutinous, and that he wanted credit for 35 days' pay at once.

Mr. CARDEW said the Isabelle Company had a credit of 700*l.*

The CHAIRMAN replied that that could not pay 1500*l.*, and he maintained that the telegram sent to Mr. Leeming was simply to save him paying the calls due from him. (Hear, hear.) Mr. Cardew employed Mr. Ashburner to report upon the mines at a cost of 240*l.*; but the shareholders did not want him to do this, for the property had already been most favourably reported upon by several mining experts, including Professor Raymond, the United States Government geologist. They were also asked to pay Mr. Cardew's expenses, because Mr. Leeming and Mr. Dunn thought proper to authorise him to visit the mines. He might add that Mr. Ashburner went to the Isabelle, Exchequer, and I.X.L. Mines at a time when he could see nothing, as he had not provided himself with a diving apparatus, and yet he reported that the property was worthless. (Laughter.) Such an opinion was simply ridiculous, and it was unfair to the shareholders to ask them to pay for these visits. (Cheers.) Mr. Leeming and Mr. Dunn were largely in arrears of their calls, and he (the chairman) proposed that the solicitor should write to them, and take proper steps to have the amount due paid—(hear, hear)—but, of course, Capt. Marcuard and Mr. Buckingham voted against the proposition. The resolution was, however, carried by his casting vote—(applause) —and Mr. Jenkin acted upon it. At the next board meeting, however, it was proposed by Mr. Cardew, seconded by Mr. Buckingham, and carried, that the majority of the directors then present expressed their regret that their co-directors, Messrs. Leeming and Dunn, should have been written to by the solicitor—nothing was said about the other shareholders—and requested him to act no further under such a resolution. (Shame.) Mr. Syme and himself in voting against the resolution stated that they would hold the directors responsible for their acts on behalf of the shareholders. (Hear, hear.) Having mentioned a variety of other matters, proving the disunion which existed at the board, the Chairman moved that it was the opinion of the meeting that Captain Marcuard and Mr. Buckingham had been improperly elected, as it was done by surprise and not by the board; and that they should, together with Mr. G. D. Cardew, be removed from the board of the company. (Applause.)

Mr. TUCKER seconded the proposition.

A long and somewhat personal discussion then ensued, in the course of which Mr. CARDEW said that he and his friends held 34,000 out of the 50,000 ordinary shares of the company, and that everything he had done had been done in the interest of the majority of those shareholders who had paid for their shares. With respect to the Penrice drill, that had been tried in France, and a very successful trial of it took place in Wales on Saturday last, at which the Messrs. Taylors were present, and believing it would be for the benefit of the company that this drill should be sent out Mr. Leeming, Mr. Dunn, and himself offered to pay for it out of their own pockets. Mr. Cardew also went into the details with regard to his visit to the mines and to San Francisco, and said that he felt it to be his duty to employ the best professional experts he could obtain to inspect the mine, and it was not his fault that the result of their inspection was unfavourable.

After some further discussion Major MARCUARD proposed that a committee of shareholders should be appointed to examine into the affairs of the company, and to report thereon, and be authorised to call in such professional assistance as they might deem to be necessary.

Mr. TUCKER said such a resolution could not be put. The meeting had not been called on the part of the company, but by a private member of the board to strengthen his hands at the forthcoming ordinary meeting of the company. The resolution was only to be put as a matter of opinion.

Mr. JENKIN (the solicitor to the company) confirmed this opinion.

Mr. CARDEW said he was going to the Court of Chancery backed up by 40,000 out of the 50,000 shares for which money had been subscribed.

Ultimately the resolution was put and carried, with one dissentient.
The meeting then closed.

[For remainder of Meetings, see to-day's Journal.]

THE SULPHATE OF SODA DIRECT PROCESS.

The manufacture of sulphate of soda by the Hargreaves and Robinson direct process formed the subject of an interesting paper read before the Faraday Club at Liverpool by Mr. John Hargreaves, and as his observations related exclusively to the technicalities of the process, the chemistry of which is already well-known, they are of considerable practical value. The process was first brought before the public about ten years ago, and since that time has slowly but surely made its way, its superiority over the old process being now clearly established in every point. The first working apparatus erected consisted of four brick chambers of 6-ft. cube. With this arrangement difficulties arose in consequence of leakage of the gases from one chamber to another without passing through the columns of salt, from the chambers into the flues, and *vice versa*. These, together with the leakage of air, necessitated a very large consumption of fuel. To overcome these evils a second experimental apparatus—consisting of four cast-iron cylinders, each 10 ft. diameter by 10 ft. high—was erected in a double line. This practically got rid of the leakage. But the small amount of material and the shortness of the column, together with a relatively large amount of radiating surface, showed the advisability of increasing the size of the apparatus. With this object two other cylinders of the same dimensions were added to the series. This addition, although giving improved results, still fell short of the object in view, and the cylinders were afterwards pulled down.

The next apparatus consisted of eight cylinders of 12 ft. diameter by 12 ft. high, with other slight modifications. The arrangement gave a long column of salt, but exposed too much cooling surface and consumed more fuel than was desirable, but it afforded another confirmation of the fact that the larger the quantity of material operated upon the smaller the proportion of fuel required. Four sets of plant, having a total of 38 cylinders of 15 ft. diameter by 12 ft. high were next erected by several firms. Each set was arranged in two rows with an archway betwixt, having two fires and two drawing doors to each cylinder for the convenience of quick discharging and re-heating. Twenty cylinders of the same size, but arranged back to back, and with only one fire-place and drawing-place to each cylinder, were afterwards erected by the Atlas Chemical Company. The working of these cylinders proved that it was quite practicable to discharge the contents of each through one drawing-door. All the foregoing experience pointed in the direction of still further increasing the dimensions of the cylinders, and arranging the apparatus compactly, so as not to expose an excessive amount of radiating surface. Convinced of this fact, the same firm decided to erect another set of cylinders of larger dimensions than any yet attempted—twelve cylinders, of 18 ft. diameter by 12 ft. high, each containing 55 to 60 tons of sulphate. Several important improvements were introduced into this apparatus. In the previously erected plants the gas, after descending through the mass of partly converted sulphate, was conducted from the bottom of each cylinder to the top of the next by means of an external pipe connected to the lower part of the cylinder. In this apparatus these external pipes are replaced by D-shaped pipes arranged in the interior of the cylinders, by which leakage of air into the upcast pipe is entirely prevented, and, besides, has the advantage of placing all the connecting joints at the top of the cylinders where they can be got at. The brickwork is also simplified, and now consists of a 9-in. ring around each cylinder, with an outer wall enclosing the whole series, the remaining spaces other than the fire-places and flues being filled up with concrete to prevent loss of heat. The hydrochloric acid is taken from the top of the circulating pipe through a movable wrought-iron syphon to a pipe fixed above the two lines of cylinders. This has considerable advantages over the earlier system of taking the exit gases through the drawing-doors, and thence by an underground flue to the exhausters, as it effects considerable economy in the amount of iron used in construction, and decreases the number of joints. This plant also contains the recently improved firing arrangements, by which the heat from the fire-places is more evenly distributed, and local heating of the cylinders rendered almost impossible, no matter how carelessly the workman may fire.

The fuel to maintain the temperature of the cylinders is now, in one of the best conducted plants, almost exclusively cinders, obtained by riddling the ashes from other furnaces in the works, and of this inferior fuel less than 2½ cwt. is required per ton of sulphate made, and consequently the cost or repairs to fire-places is almost *nil*. The salt was originally prepared by moistening with water, and forming into lumps by drying on floors heated from beneath, and afterwards broken into small pieces by a mill. This preparation is now performed entirely by machinery. The moistening is effected by the waste steam from the engine supplying the motive power. It is important that the prepared salt be sufficiently porous to allow the diffusion of the gaseous re-agents, and also free from dust, so as not to close the passages through which the gases circulate in traversing the cylinders. The kind of salt varies with the purpose for which the sulphate is required. Ground rock, surface evaporated salt, sweepings from saltworks, and other cheap sources are largely used for the process where sulphate is made for alkali manufacture. When it is required to use the sulphate without refining, for the manufacture of plate-glass, it is necessary to use salt containing only traces of iron. The salt prepared by Mr. Otto Pohl's method works exceedingly well in the direct process. His system consists in evaporating the brine by bringing the products of combustion into direct contact with it in one vessel, while above there is a pan in which another quantity of brine is heated from below. It is found much more economical than the ordinary system of salt manufacture. Any carbonaceous matter contained in salt used for the direct process is quickly burnt out in the cylinders, leaving a perfectly white sulphate.

When a cylinder is filled with salt it is made the exit of the series, and quickly becomes elevated to a working temperature (which may be estimated at 400° C.) by the hot gas coming from the previous cylinders, and also by the action of the small fire attached. As soon as the formation of sulphate commences the temperature rises rapidly, rendering the further application of external heat unnecessary until—in consequence of the small amount of chloride remaining—the heat generated by chemical action diminishes. As the salt becomes converted into sulphate it is brought nearer and nearer to the source of sulphurous acid, the proportion of which passing the cylinder increases daily, until it becomes the first cylinder in the series, when it receives the red-hot gas coming direct from the burners, which quickly decomposes the remaining chloride. The time occupied in decomposing the contents of a cylinder varies with the kind of salt and the size of the pieces employed, but under ordinary circumstances should not exceed 21 days, and has often been done in less than 14 days. When the charge is decomposed, the cylinder is isolated by closing the dampers connecting it with the sulphurous pipe and the succeeding cylinder, which latter in its turn is made the first in the series. The drawing-door is now opened, and the sulphate discharged: after which the cylinder is re-filled, and again made the last in the series. The pyrites burners, with the exception of being better protected against heat losses, are the same as used in the old process. The draught from the burners is obtained by means of exhausters placed on the passage from the cylinders to the condensers. The waste steam from the engine driving these, after passing through a superheating coil, heated by the waste products of combustion coming from the cylinder fires, is mixed with the sulphurous acid in the burners to supply the necessary water vapour for the decomposition of the chlorides. Besides being an economical source, this has the advantage of automatically regulating the supply of steam to the sulphurous acid, which must vary with the speed of the engine driving the exhausters.

Many important advantages are claimed for the process. Although the cost of the apparatus is about the same as that required for the old process, there is this difference: That whereas the life of a vitriol chamber may be estimated at (say) ten years, the cylinders used with ordinary care in the direct system show every sign of lasting three times that period without renewal. Only half as much fuel as in the old process is required, and there is less labour, with the exception of the burner men, and one intelligent person to look after the plant, no skilled labour is required. An apparatus has been working several years, and 6d. per ton of sulphate made has covered the cost of repairs. No nitrate of soda is necessary, and cheaper qualities of salt, not available for the old process are used. The sulphate made contains very little chloride and free acid, and, therefore, specially adapted for the manufacture of 76 per cent. or other high strength caustic for which it is largely used. Sulphate of such a quality commands a decided preference over that made by the old process, and in practice sells for about 2s. 6d. per ton over the ordinary market rate. It is said that it can be used without refining for the manufacture of plate glass, and is superseding that of the old process which has to be refined at an additional cost of 25s. and upwards per ton, before it is fit for this purpose. The aggregate cost of production is estimated at 15 to 20 per cent. less, so that it is not surprising that the process is now rapidly extending. Eight sets of apparatus are now at work, three others are in course of construction, giving an aggregate capacity of production of about 67,000 tons per annum.

NOVEL MOTOR ENGINE.

A peculiar type of rotary motor engine, which it is claimed can also be adapted to work as a water motor, has been invented by Mr. JOHN MCPHERSON, of Liverpool. It consists of a cast-iron or other metal casing or box, which is steam filled. Within this casing or box there is hung a pendulous steam chamber having parallel sides, the lower end forming a segment of a circle, and the upper end being rounded to receive an eccentric crank hereafter referred to. The shaft of the engine passes centrally through the casing and through the pendulous steam chamber, and has formed thereon or attached thereto an eccentric crank, which fits between the sides of the pendulous steam chamber, and is of depth equal to the depth of the steam chamber. The eccentric works between two slide blocks, which work against plates provided with an elastic packing on the sides of the steam chamber. The pendulous steam chamber works between the one cover of the casing and an adjustable plate formed on the other cover of the casing, such cover and plate forming sides to the steam chamber.

Steam is admitted to the casing by a slide-valve worked by an eccentric from the shaft, and through passages (on the cover of the casing) and ports which lead into the top and bottom of the pendulous chamber. The engine is also supplied with a pipe which admits steam to the casing, so that the pendulous steam chamber moves in an atmosphere of steam, having a like pressure all round to counterbalance the pressure within the pendulous steam chamber. Rotary motion is imparted to the shaft by the force of the steam acting against the major radius of the eccentric crank, which revolves within the steam chamber, the steam acting alternately at the top and bottom of the steam chamber, and alternately exhausting therefrom. The steam may be worked expansively by providing a cut-off at the back of the slide-valve, and the steam may be led to a condenser if required to produce a vacuum in the steam chamber on the side of the eccentric not being operated upon by the steam. In operation, one or more engines may be used to work one length of shafting or one shaft. The engine is specially adapted for driving rotary blowers, pumps, and other like purposes.

UTILISING WASTE PRODUCTS IN GALVANISING IRON.

For rendering the surface of iron or steel adaptable to receive a coating of zinc, of tin, or of other metals, the acids ordinarily employed for treating it are sulphuric acid, muriatic acid, and muriatic acid with some sulphuric acid in it. The treatment about to be described applies only when muriatic acid alone or mixed with sulphuric acid is used, and it is assumed that the pickling acid used is the ordinary commercial muriatic employed very largely in galvanising works. Galvanised iron, so called, is iron coated with zinc, and sometimes tin is also so used as part of the coating. In either case it is usual, in the first instance, to immerse the iron, whether wrought or cast, for a certain time (variable according to the quality and condition of the iron and the strength of the acid) in a bath of hydrochloric acid and water, which is rarely if ever quite pure. The scale, any ferrous and ferric oxides, and other impurities are removed from the iron surfaces, and the iron, after any subsequent scraping that may be found needful in places, is passed through a flux of ammoniacal salt into the molten metal with which it is desired to coat it. The result of the pickling of the iron in the more or less dilute acid is that hydrogen gas is evolved, and that a solution of chlorlde of iron is produced, and this forms the bulk of the waste wash or pickle—the partially spent acid, that is then usually thrown away into the sewers or otherwise.

Not only is this ferruginous salt thus entirely wasted, but the disposal of it often leads to complaints from municipal authorities and individuals, Mr. F. BRABY, of the Euston Works, Euston-road, has, therefore, patented an invention the object of which is to recover the hydrochloric acid in the ferruginous salt, and also to utilise the iron thereof, for which purpose the waste wash or pickle is treated with oil of vitroil, which drives out the hydro-chloride acid as gas, and converts the remanent iron into ferrous sulphate, and thus a hitherto waste substance becomes converted into two useful articles of commerce. For this purpose the waste wash, which still contains some free acid, is neutralised with scrap-iron in a tank or other suitable vessel, and is filtered either by passing through a wooden or other trough with a number of gravity partitions, or by passing it through gravel or through huckaback or coarse canvas. Or instead of filtering it may be decanted after subsidence only. The neutralised fluid is then concentrated by boiling down to a syrup, and is then treated with the oil of vitroil, or the evaporation may be continued to the formation of solid green hydrated ferrous chloride before the vitriol is added. But instead of either of these modes of treating the spent acid it may be evaporated down to dryness—to the white anhydrous solid form. This can be effected favourably by a reverberatory furnace, or by any other ordinary method.

The dry chloride of iron is then placed in a closed vessel, and the oil of vitrol is then gradually added. The delivery of it into the chloride is effected preferably by distribution over the surface rather than into one portion of it only. The hydrochloric acid gas that is evolved by the stronger acid taking possession of the iron of the ferrous chloride, is led by a pipe from out of the vessel, which may be called the mixer or digester, into receiving stone, earthenware, or glass Woulfe's bottles, or carboys containing water, and is there condensed into muriatic acid ready for sale or use. To ensure as strong an acid as practicable these receivers should be kept cold. The tower usually employed for collecting muriatic acid may be used instead of the Woulffe's bottles. Only a portion of the gas will come over in the cold, but by the application of long continued heat and by using sufficient oil of vitrol the whole of the hydrochloric acid will be liberated. Sulphate of iron approximately anhydrous remains in the digester. This upon being removed is treated with the necessary quantity of water to form the green hydrated copperas of commerce, which is crystallised by the usual method. By preference, he effects this in the following manner:—He neutralises any free sulphuric acid by addition of scrap-iron, preferably in the cold, and in a lead lined vessel (the progress of the neutralisation being probably aided by galvanic action of the lead lining) the solution is then placed in a tank provided with a steam coil, and is thus concentrated. To neutralise any small amount of acid still remaining free a piece of iron may be placed in the tank. When arrived at the right degree of concentration by evaporation the mass is removed into shallow coolers for crystallisation, the mother liquor being afterwards worked up again.

The heating medium employed in the recovery of the hyrochloric acid may be a bath of chloride of calcium or paraffin, but the heating can be effected by superheated steam or in other known ways. Between the digester and the receiving Woulffe's bottles or carboys, when these are employed, he introduces, by preference, an intermediate washer or purifier, for the purpose of arresting impurities, such as sulphuric acid, perchloride of iron, organic substances, water, and sulpher compounds. This washer may consist of merely a vessel of water to absorb impurities along with muriatic acid, and so when this is saturated to allow the subsequent receivers to condense the pure gas, or, by preference, it consists of a dry worm encased in water, and terminating in an empty or nearly empty glass or other vessel, in which impurities fall after passing through the worm, and the pure gas will be then led from it into the series of receivers charged with water.

When the original pickle contains with it some little sulphuric acid this is converted by the action of the iron upon it into sulphate of iron, and comes out in the natural way at the end of the process as copperas. This indicates the deposit of any sulphuric acid that may happen to be associated with the muriatic acid, but there is no claim made in respect of any treatment of such sulphuric acid.

BASSET AND BULLER CONSOLS.

Few mines are better known in Cornwall than the Bassets and the Bullers, and the promoters of Basset and Buller Consols hope that by the exercise of judgment and energy they willl have no difficulty in maintaining the reputation of the district. The capital has been fixed at 36,000*l*., in shares of 1*l*. each, of which 7200 fully paid, with 4800*l*. in cash, are taken by the vendors as purchase-money; 7200 are held in reserve for future issue to develope the Great Flat tin lode and for other purposes; and 21,600 are offered at 13s. 4d. paid, so that 6s. 8d. will remain to be subsequently called up. Thus the unlimited liability of the Cost-book System is avoided, yet a reserve capital of 14,400*l*. to meet contingencies or miscalculations is provided. The prospectus states that the purchase includes the lease, agreement for lease, plant, machinery, and appurtenances of an extensive copper and tin producing property, formerly worked as three distinct mines, known respectively as East Basset, Copper Hill, and Wheal Buller. The lease for East Basset and Copper Hill contains the agreement for the lease of Wheal Buller. These three setts, which are now consolidated, comprise an area of about 180 acres, and adjoin each other, all being situate in the parish of Redruth, in the county of Cornwall. The minimum rent for the whole area is only 50*l*. per annum, which will merge in dues at the low royalty of 1-24th of the produce. The machinery, buildings, &c., at surface consist of a 36-inch tin stamping engine, with 36 heads of stamps complete, a horse-whim, wire-ropes, chain and kibbles, offices, engine-house, smithy, storehouse, and other necessaries.

The prominent features adduced in favour of the company are that the copper lodes, which in Wheal Basset returned 360,000*l*. profit, are standing intact in the Wheal Buller sett; and there is no reason that can be advanced why they should not be equally rich in the latter as they were in the former, the geological conditions being precisely similar. That the 30 fm. level cross-cut, which is now being driven by the present owners, has already intersected two valuable lodes and Capt. Pryor is of opinion that he is close to the copper lode, which was so rich in Wheal Basset—the same company which is now driving to the great flat tin lode on the western boundary of this company's property. That a copper lode in the Copper Hill sett, which returned the old shareholders 300 per cent. on the outlay in working it, is standing whole at the old boundary line, between Copper Hill and Wheal Buller setts; that a copper lode in the East Basset sett, which returned 60,000*l*. profit, is standing untouched from a depth of 62 fms. to surface; and that a copper lode in North Wheal Bassett gave its proprietors a profit of 80,000*l*.; this lode stands intact in East Basset sett. But probably the most important feature of all is the fact that the great flat tin lode, which is the master lode of the district, is believed to underlie the whole of this company's area. In regard to this lode, it has been ascertained in some of the adjoining mines that its general dip south is counteracted by a series of upheavals, averaging about 8 fms. each, each upheaval respectively being apparently caused by its coming into contact in turn with the several copper lodes which run east and west. The important effect of these upheavals is that the great flat tin lode referred to is found to be workable over an extensive area, and with its immense productiveness is practically inexhaustible.

The extent of the property is verified by the report of Mr. Robert Symons, of Truro, and Capt. Richard Pryor's report upon the mining capahility of the property, is highly encouraging. The management is in the hands of a committee, who act gratuitously until the statutory meeting, when the drectors will be appointed; and it is remarked in the prospectus that having regard to the fact that this company possesses not only the great flat tin lode, which in some of the neighbouring mines constitutes substantially their present value, but also the series of rich copper lodes which in Wheal Basset, North Basset and others returned at least 500,000*l*. sterling in profits, the committee have no hesitation in recommending the shares of this company to the attention of investors.

THE SILVER AND GOLD MINES OF SALIDA.—The interesting reports of Messrs. Reinier D. Verbeek and John Munday, on the Silver and Gold Mines of Salida, on the West Coast of Sumatra, has just been reprinted in pamphlet form and in English (Amsterdam: C. A. Spin and Son), and thus made available to a larger number of readers. The veins are of extraordinary thickness. The mines, says Mr. Verbeek, are extremely favourably situated in every respect. The vicinity of a tolerably important river makes it convenient to construct the necessary works for the separation and reduction of the ores obtained. The neighbourhood of the sea coast offers an easy opportunity for the conveyance of all means necessary for the working, All circumstances agree in promising great success. Mr. John Munday says—"This mining property is well situated both for the purpose of actual mining and for the erection of machinery for the reduction of the ore, as tunnels can be driven from the surface to cut the lodes, or shafts sunk, as may be thought desirable; and there is a river flowing at the base of the hill in which the mine is situated. There are also two small streams of water running down the gulley near the deep tunnel, the volume of which could, no doubt, be augmented by cutting races around the mountain side. The ground is situated in the heart of a wooded country. The mine is reported to have yielded large returns of gold and silver when worked 200 years ago, a statement which the state of the works at the present time would go to confirm. The ground is very accessible, being within four paals of the sea shore; and from what I have seen of it I have formed an opinion that it Is a property well worthy the attention of capitalists, and I have no hesitation in saying that I believe that mining operations conducted upon it with modern appliances, and judiciously carried out, would be very remunerative."

THE COMSTOCK LODE.—The opinion entertained by some authorities in this country that the Comstock lode is practically exhausted does not appear to be shared on the other side of the Atlantic, for it is remarked that the anticipated bonanza on the Comstock lode, as predicted by the Virginia Chronicle, is quite encouraging, and strong hopes are now entertained. The bulged condition of the surface of the ground in the vicinity of the Ophir and Mexican indicates the presence of a large ore body. The hypothesis upon which the prediction is based is this. This bulging of rock, double dip, or whatever it may be called, is also attended by other features that are worthy of attention, and add to its significance. It is found to occur in the promontory of ground that lies within the circling horns of the great bend of the vein, the apex of which lies in the Mexican mine. Within the chord of the arc formed by the Comstock is the heaviest mass of vein material that has yet been encountered on the lode, as all mining men who have examined it agree in asserting. It is a mass of vein matter sufficient to nourish a much larger bonanza than that found in the California and Consolidated Virginia. Experts disagree about the probable distance to this supposed bonanza, but all think it will come in somewhere about the 3000 level—that is, within the next 400 or 500 ft. Persons best acquainted with the ground are strongest in the faith that it contains a first-class bonanza.

BASIC FURNACE LININGS.—As an improvement upon the processes of Mr. S. G. Thomas and of Mr. E. Riley, with which the readers of the Journal are familiar, Mr. ANTON VON KERPELY, of Schemnitz, Hungary, proposes to mix lime with pyroligneous acid and water. He prefers to use dolomitic lime, and to make the mixture slowly, so that a too violent action does not take place. He has found 25 cubic centimetres of wood vinegar, 25 of water, and 112 grammes of lime a good mixture. This plastic material may be used

as a binding material for lime or dolomite. He much prefers, however, to mix it with powdered dolomite or limestone which has been treated with hydrochloric acid. Of this material bricks may be made, which after pressure and drying are fired at an intense white heat for some hours. He sometimes mixes varying quantities of ordinary uncalcined dolomite with the prepared material before forming it into bricks.

ST. JOHN DEL REY MINING COMPANY (Limited).—Advices received Dec. 31, 1880, dated Morro Velho, Dec. 2:—

GENERAL OPERATIONS.

GOLD EXTRACTED TO DATE.—The produce for the second division of November, a period of eight days, amounts to 4787 oits, = 551·8630 ozs. troy. It has been derived as follows:—

	Oits.		Tons.	Oits. per ton.
General mineral	2,618	from	574 =	4·561
Mineral free from killas	1,975	,,	265 =	7·452
	4,593	,,	839 =	5·474
Re-treatment	194	,,	— =	0·231
Total	4,787	,,	839 =	5·705

MINE.—Return of duty for 13 working days:—

Mineral raised from the mine	1907 tons.
Mineral quarried per borer per diem	1·14 ,,
Average attendance of borers daily	128·15
Average attendance of natives daily	279·69
Sinking sump-shaft vertically	1 ft. 0 in.
Condition of lode as last reported.	
Driving cross-cut south	14 0
This has now been suspended, see report for October.	
Driving cross-cut north	14 3
Total length	7 fms. 5 ft. 3 in.
The proportion of pyrites is less, owing to the admixture of a dense and darkish quartz, similar in composition to that within the excavation, Section 276 D.	
Driving western level	18 ft. 6 in.
Total length	18 fms. 3 ft.
Through the same unmineralised killas.	

DRIVING SECTION 214 B, A SOLLAR.—This exploratory level has now been commenced.

B SINK.—A communication with section 277 D, eastern section, has been effected.

PERMANENT MACHINERY.—Very satisfactory duty has been performed with this important work. On the 8th inst. it is proposed to suspend hauling operations through the B shaft, for the final completion of the work. Estimated period of stoppage, 15 days.

Total rainfall for November ..... 10·21 in.

Advices received Jan. 17, 1881, per Mondego (s.), dated Morro Velho, Dec. 18:—

GENERAL OPERATIONS.—Owing to the more frequent interruptions and the daily employment of a large force on the permanent haulage work, the produce for the month is as much as could be reasonably expected.

GOLD PRODUCE FOR THE MONTH OF NOVEMBER.—The gold extracted during this period amounts to 18,618·6 oits., equal to 2146 4216 ozs. troy. It has been derived as follows:—

	Oits.		Tons.	Oits. per ton.
General mineral	9,678·8	from	2479 =	3·904
Mineral free from killas	7,430·0	,,	1013 =	7·334
	17,108·8	,,	3492 =	4·899
Re-treatment	1,509·8	,,	— =	0·432
	18,618·6	,,	3492 =	5·331

The lower yield per ton is due to the larger output of low grade mineralised killas from section 277 west, the greater part of which was extracted from the poor bar of ground underlying the good mineral, and through which bar a communication has now been made.

COST AND PROFIT.

Produce for November ... 18,560·4 oits., at 7s. 9d. per oit. =	£7192	3	1
Cost	7102	14	11½
Profit for the month	£ 89	8	1½

Under the circumstances above recorded, and from information given in previous communications, the small profit above recorded will to some extent have been anticipated.

MINE.—Mineral raised from the mine ..... 3480 tons
Mineral quarried per borer per diem ..... 1·14 ,,
Average attendance of borers daily ..... 117·69
Average attendance of natives daily 264

Owing to the limited extent of stoping and sinking operations throughout the mine, there is no change to report in the condition of the lode.

SECTION 277 D.—Since the date when the communication was effected every available borer has been employed on this stope, so as to unite the two sections of the mine, whereby a more rapid haulage and a more direct system of drainage will be afforded. At no very distant date measures will be taken for the formation of another pillar of killas of the same dimensions as the one in sections 256 and 277.

WESTERN LEVEL.—Owing to the continued absence of any favourable indications this exploration has now been suspended.

CUIABA.—Gold produce after melting for November 859·1 oits., from 272 tons, equal to 3·158 oits. per ton.

PRODUCE AND COST.

Produce, as above, 859·1 oits., at 8s. 1d. per oit.	£ 347	4	4½
Cost, inclusive of deep adit, surface buildings, and erection of stamps	1101	0	10¾
Excess of expenditure	£ 753	16	6¼

The produce has been derived as follows:—

	Oits.		Tons.	Oits. per ton.
Serrote	168·7	from	100 =	1·687
Fonte Grande	137·5	,,	79 =	1·740
Alto da Victoria	97·5	,,	54 =	1·805
Pitangueira	467·0	,,	39 =	11·974
Total	870·7	,,	272 =	3·201

The low yield per ton is due to the still disordered condition of the lode in the Fonte Grande section, and to the lower gold contents of the Serrote mineral, which appears to have temporarily declined. No great importance should be attached to the above low yield, seeing that the mineral extracted has been confined to level extension. The percentage loss in treatment is also higher, owing to the apparently more complex nature of the mineral, and the want of re-treatment machinery, the erection of which it is not possible at present to undertake.

DEEP ADIT.—By the Cranston drills this has been extended 10 fms. 2 ft. 9 in.

NEW STAMPING MILL, 40 HEADS.—The necessary excavation is being rapidly pushed forward, and the greater part of the timber required for its construction has been received. The time required for the completion of this work is estimated, at the least, at six months, owing to the pressing call for other equally important work.

MORRO VELHO GOLD PRODUCE EXTRACTED TO DATE.—The produce for the first division of December, a period of 12 days, amounts to 6539 oits., equal to 753·3402 ozs. troy. It has been derived as follows:—

	Oits.		Tons.	Oits. per ton.
General mineral	3,395·5	from	931 =	3·647
Mineral freed from killas	2,702·0	,,	389 =	6·946
	6,097·5	,,	1320 =	4·618
Re-treatment	441·5		— =	0·334
Total	6,539·0	,,	1320 =	4·952

All the stamping mills were suspended on Dec. 11. During this period of stoppage there will be a general clean up of the passes, coffers, and launders, from which a large quantity of sand should be obtained. The re-treating machinery at the Praia has, meanwhile, been supplied with sand from the large heap.

MINE.—Return of duty for 13 working days:—

Mineral raised from the mine	1518 tons
Mineral quarried per borer per diem	1·04 ,,
Average attendance of borers daily	111·54
Average attendance of natives daily	256·61

The foregoing figures, though as near as can be arrived at, do not accurately represent the duty done per borer, because no allowance has been made for the mineral quarried, and remaining in the B section, nor for a quantity of unweighed ore deposited at the mouth of A shaft since Dec. 10. The aggregate quantity cannot be exactly stated, but it amounts to several hundred tons, and if added to the output given would considerably increase the duty.

CROSS-CUT NORTH, SECTION 276 D.—Strong indications of the existence of mineral north of the present wall have lately been met with, and the further advance of the forebreast, and the sides east and west where opened upon within the last few days has disclosed a compact body of dense pyritic mineral.

Until further developed no reliable opinion can be ventured as to the connection between this apparent new zone of mineral ground and the lode within the excavation. To more fully ascertain this a second cross-cut from 277 D will at an early date be commenced.

The superintendent further writes on this subject as follows:—"In the north cross-cut it would appear that we are on the eve of what may eventually prove to be a discovery of primary importance, but what the relation thereof may be with the existing body is at present difficult to say. The indications so far met with, and the somewhat different appearance and weight of the mineral, give rise to the doubt as to whether in the present excavation the entire body of the lode formerly worked is embraced. As, however; there has been a daily gradual improvement both in the forebreast and in the sides now being opened I have, considering our late depression, taken upon myself the responsibility of the telegram before given, so worded as to avoid any undue expectation. Moreover, I think I am now warranted in stating that the indications seem to be unusually promising. Samples for your inspection from both forebreast and sides have been kindly taken charge of by Mr. Cranston for delivery to yourselves."

PERMANENT MINE HAULAGE WORK.—For the final completion of this, this hauling through B shaft was suspended on Dec. 10, and since that date all possible force night and day has been employed thereon. The most important work is the erection of the new poppet heads, and the entire refitting of the shaft at surface, likewise the relaying of the mineral line to the spalling floors.

The small output of mineral through A shaft is being temporarily stocked at surface.

CUIABA.—A communication through the Vianna adit to the Pitangueira workings was effected on Dec. 12.

The gold troop, conveying four boxes of bar gold, weighing in all 19,711·2 oits., equal to 2272·3806 ozs. troy, was dispatched for Rio and England on the 16th inst.

N.B.—The gold has duly arrived.

Telegrams received:—On Dec. 20, dated Rio, 20th—"Produce, 12 days (first division of December), 6500 oits. Yield, 5·0 oits. per ton. Hauling suspended, for putting in hauling engine. North cross-cut greatly improved."

On Jan. 11, dated Rio, 10th—"Produce for the month of December, 14,000 oits. Yield, 5·3 oits. per ton. Breakage of pumping machinery, requiring five days to repair.—Cuiabá: 350 tons stamped in the month. Yield, 2 oits. per ton."

Basset and Buller Consols, Limited.

CAPITAL £36,000, IN 36,000 SHARES OF £1 EACH.

21,600 SHARES AT **13s. 4d.** PER SHARE—EQUIVALENT TO A BONUS OF **50** PER CENT.—ARE OFFERED ONLY TO THOSE WHO SUBSCRIBE ON OR BEFORE THURSDAY, THE 3RD FEBRUARY.

ABRIDGED PROSPECTUS.

This company is formed to purchase the Lease, Agreement for Lease, Plant, Machinery, and Appurtenances of an extensive Copper and Tin producing Property, formerly worked as three distinct mines, known respectively as East Wheal Basset, Copper Hill, and Wheal Buller.

These three setts which are now consolidated comprise an area of about 180 acres, and adjoin each other, all being situate in the parish of Redruth, in the county of Cornwall.

The reports of Mr. Robert Symons, Mineral Surveyor, Truro, and of Capt. Richard Pryor, Mining Engineer, Redruth, accompany the prospectus, which show:—

1st.—That the Great Flat Tin Lode—the master lode of the district—underlies the whole of these properties.

2nd.—That the series of rich copper lodes which in Wheal Basset, North Basset, and other neighbouring mines returned at least HALF-A-MILLION STERLING in profits stand intact in this company's property.

Prospectuses may be had of Mr. Robert Symons, Mineral Surveyor, Truro; Capt. Richard Pryor, Mining Engineer, Redruth; of the company's bankers, Messrs. Prescott, Cave, Buxton, Loder, and Co., London; Messrs. Bolitho, Sons, and Co., Penzance, and of the undersigned. By Order, ROBERT MAKEPEACE, Secretary.

85, GRESHAM STREET, LONDON, E.C., 22ND JANUARY, 1881.

THE

Hoover Hill Gold Mining Company

(LIMITED).

INCORPORATED UNDER THE COMPANIES ACTS, 1862 TO 1880.

CAPITAL £120,000, IN 120,000 SHARES OF £1 EACH.

Of which 40,000 are reserved as part payment to the vendors, 40,000 have already been applied for, and will be allotted in full at par, and the balance, 40,000, are now offered for subscription at par, payable as follows:—
2s. 6d. on application, 7s. 6d. on allotment, and 10s. on the 18th February, 1881

DIRECTORS.

GEORGE HOPKINS, Esq. (Chairman), Chairman of the Richmond Consolidated Mining Company (Limited).
Sir DAVID LIONEL SALOMONS, Bart., Chairman of the Devala Moyar Gold Mining Company (Limited).
HENRY HUGHES, Esq., Chairman of the Peel River Land and Mineral Company (Limited).
CHARLES WALTER STRONGE, Esq., C.B. (late of Her Majesty's Treasury).
The Honourable F. A. J. CHICHESTER.

MINING AND RESIDENT ENGINEER AT MINES—MR. JOSIAH REMFRY (Mining Engineer).

BANKERS—The NATIONAL PROVINCIAL BANK OF ENGLAND (Limited), 112, Bishopsgate Street, E.C.

SOLICITORS—Messrs. LATTEY and HART, 16, Devonshire Square, Bishopsgate Street, E.

AUDITORS—Messrs. TURQUAND, YOUNGS, and CO., 41, Coleman Street, E.C.

BROKERS—Messrs. HELBERT, WAGG, and CAMPBELL, 18, Old Broad Street, E.C.

SECRETARY *(pro tem)*—Mr. E. HARBOROW.

OFFICES—9, KING'S ARMS YARD, MOORGATE STREET, E.C.

This company is established for the purpose of purchasing a freehold mineral property, comprising 263 acres of land, known as the Hoover Hill estate, situate in Randolph County, North Carolina, distant 15 miles from High Point, a thriving town on the Piedmont and Air railroad, having access thereto over good roads, and within 24 hours' rail of New York.

The Hoover Hill Mines were discovered before the outbreak of the Civil War. For some time the people of the neighbourhood helped themselves to the gold without hindrance; then a system of leasing was adopted, the ground being divided into small tracts, and allotted to various lessees for a term of 20 years, and even under this desultory system large quantities of gold were taken from the surface.

Mining has been entirely suspended since the war, and it was only at the beginniag of last year that the whole property passed into one possession.

A part of the estate is under cultivation, and the rest is heavily timbered with oak, pine, hickory, and mahogany—a fact of great importance. The river Uwharrie runs through part of the property, thereby ensuring a plentiful supply of water. Shorn of its angles the estate resembles a parallelogram, and through its entire length for nearly one mile runs an auriferous channel of ferruginous clay slate some 400 ft. wide. In this belt are imbedded quartz veins running parallel with each other. Towards the north-eastern side, at a point forming the highest elevation, about 200 ft. above the level of the river, is found a number of old workings and several shafts. Here a powerful quartz reef crops up to surface, and on it is found these old workings, which represent the entire exploitations made throughout the property. Lying about, in close proximity to these workings, are from 1500 to 2000 tons of quartz. Samples taken from these heaps and tested on the spot gave excellent results.

The available quantity of auriferous mineral is practically inexhaustible, both as regards clay slate yielding gold in paying quantities, as well as quartz or quartzite veins, which will average many ounces per ton.

The climate of this region of Carolina is one of the most delightful in the world. Labour is cheap—very cheap in contrast with that usually paid in mining districts of the Far West.

In October last, Mr. Josiah Remfry, a mining engineer (on whose authority most of the above statements are made), who has had great experience in gold mining, was sent out to make an independent inspection of the property, and after a most exhaustive enquiry, he has made a very favourable report, a copy of which accompanies the prospectus.

It will be seen from Mr. Remfry's report that the various samples were taken from fresh blasts made under his own supervision, and that none of them were in any way selected except one—No. 7 chosen from the dumps in which the admixture of sulphides is apparent.

An inspection of the various parcels will at once prove that selection was almost impossible, no gold being visible.

The following are the results of assays made by Messrs. Johnson, Matthey, and Co.:—

ASSAYS.

Mark of sample.	From where taken.	Depth from surface.	Produce of gold. Ozs. per ton.
No. 1 G	Gallimore shaft	About 70 ft.	32·500
No. 2 B	Bottom of Briols	,, 20 ft.	5·800
No. 3 P	Provost shaft	,, 100 ft.	26·100
Nos. 4 and 5	Samples from dumps lying about Hawkins, Thomas, and Lee's shafts (refuse of old workings)	—	1·050
No. 6 H	Open cutting south-east of Hawkins' whim shaft	—	9·450
No. 7 O C	Open cutting between Hawkins' and Provost shafts	—	4·050
No. 7	Sample of ore from general workings, impregnated with sulphides	—	91·450

Such results as are shown by these assays are seldom met with in gold mining in any part of the world.

It is proposed by Mr. Remfry to drive a tunnel of the comparatively short length of 250 to 300 ft., which would effectually drain all the mines, thereby saving the great expense both of pumping and bringing the ore to bank.

Mr. Remfry has personally assured the directors that he is satisfied of being able to have the first battery of 20 stamps erected so as to be in full work in four months' time, and adding 50 per cent. to the estimated expenses of mining, milling, and management, and assuming 20 stamps to be capable of crushing in 280 days only 11,220 tons of quartz, the profit on an average return of 1 oz. only of gold per ton gives an annual profit of £25,200.

Having regard, however, to the extraordinary result of the assays, which show an average of 13 ozs. of gold per ton of quartz crushed (without reckoning the highest assay, No. 7, which cannot be properly brought into such a calculation), a very much larger average may certainly be expected; and inasmuch as the costs of production are not materially increased by reason of a larger return of gold, it may be assumed that each additional average ounce of gold per ton of quartz crushed will give an additional profit of £40,000 per annum; and on this calculation, assuming an average return of 3 ozs. of gold only, the annual profit would amount to £105,200 per annum.

It will be noticed that these figures assume a battery of 20 stamps only to be in work, but arrangements will at once be made for adding further batteries, with their mashinery, with as little delay as possible, and also for erecting proper reduction works.

This property would never have been offered in England if the vendors had not made arrangements for its sale previous to Mr. Remfry's inspection. Had ths result of Messrs. Johnson, Matthey, and Co.'s assays been known any capital required could have been easily found in the United States.

The company is promoted by the vendors, who, by an agreement bearing date the 11th day of January, 1881, made between Alphonso F. Tilden, Oliver S. Cousey, and William O. Jones of the one part, and Edward Harborow (as trustee on behalf of this company) of the other part, have fixed the purchase money at the sum of £70,000, £30,000 part thereof payable in cash and £40,000 payable in fully paid-up shares.

The assays being so very high the directors have thought it expedient to send out Mr. H. Bauerman, A.S.M., a mining engineer, who has inspected the samples in London, from which portions for assay were taken, and who was specially recommended to them by R. Etheridge, Esq., F.R.S., President of the Geological Society, with instructions to make a careful inpection of the mines, and no payments will be made on account of purchase money until he has reported by telegraph to the satisfaction of the directors that he is able substantially to verify the accuracy of Mr. Remfry's report. The report, when received, will at once be published for the information of the shareholders.

The vendors are bound to retain 20,000 out of the 40,000 shares to be allotted to them for a period of 12 months from the date of the incorporation of the company.

The vendors pay all legal, printing, advertising, and other expenses, other than brokerage on shares, incident to the incorporation of the company, thus leaving about £50,000, after payment of purchase money, available as the working capital.

An agreement has been entered into, bearing date the 10th day of January, 1881, and made between Josiah Remfry of the one part, and the said Edward Harborow, on behalf of the company, of the other part. Under this agreement the company secure the services of Mr. Remfry, as Superintending Mining and Resident Engineer, for a term of five years, his remuneration being 5 per cent. on the net profits of the company, and a nominal fee of £250 on each battery of 20 stamps being erected and placed in full working order.

The above agreements, together with the Memorandum and Articles of Association, are open for inspection at the offices of the solicitors of the company.

Prospectuses and Forms of Application for shares can be obtained from the offices of the company, or from the bankers, solicitors, or brokers.

In the event of no allotment being made, amounts paid on application for shares will be returned in full, on production of banker's receipt.

Applications must be made accompanied by a deposit of 2s. 6d. per share.

London, January, 1881.

THE HOOVER HILL GOLD MINING COMPANY

(LIMITED).

The LIST OF APPLICATIONS FOR SHARES in the above Company will be CLOSED for THE COUNTRY THIS DAY, SATURDAY, the 22nd instant. By Order, E. HARBOROW, Secretary.

9, King's Arms-yard, Moorgate-street, January 20, 1881.

FOREIGN MINES.

DON PEDRO.—Mr. Treverton writes under date Dec. 18, 1880: Since my last the weather has ameliorated, and progress made better than formerly.—Accumulator: Masonry of this will be completed sufficiently dry to lay on the two bottom timber carriers on Monday, when a little more masonry will be required to be built between the timber.—Conduit: Excavation made to site of engine, and wall of conduit from hydraulic to accumulator being lengthened to put in the cast-iron water pipes.—Steam Engine: Excavation for foundation of this made, ready to build the masonry, which will be commenced as soon as ever the masons finish that now in hand. Roof made and put up, and strongly built and covered over with tiles, and all works in connection with erection of new machinery well in hand.

Mine captain's report, dated Dec. 18: 60 ft. Wheel and Drainage: This has been in abeyance since my last, force being required for erection of new machinery, &c.—Bridges: Two repaired that were seriously damaged by the heavy rain, these being important tor transit of material to the mine. Roads repaired in places where it was imperative for the carts to pass.—New Machinery: Masonry of accumulator and around it built high enough to lay on the bottom pieces of timber; after it is laid on a little masonry will be required between and around the timber carriers, excavation made, and conduit extended on to site of engine; to lay the cast-iron water pipes in, foundation, or rather excavation, made for it; to build the masonry of foundation of engine; stones laid for putting legs or uprights of roof on, and roof put up and covered over. This is a good job done, and the foundation of engine can be built without any detriment caused by the weather, as the masons will be under shelter. Ironwork required for new machinery advancing well, and all being done that can be possibly for the furtherance of the work.

RICHMOND CONSOLIDATED.—Telegram from the mine at Eureka, Nevada: Week's run, 850,000, from 870 tons of ore. Refinery, 855,000.

— R. Rickard, Eureka, Nevada, December 29: I beg to hand you a report of the different operations for the past week.] Lizette Tunnel, cross-cut has been drifted 19 ft. in good ground. The 200 north cross-cut has been advanced 7 ft., without any change to mention. The 500 drift north from No. 12 chamber has been extended 6 ft., in hard limestone. The 500 north, from No 14 chamber, has been drifted 13 ft., in favourable ground for drifting. The 600 north, from No. 14 chute, has been extended 6 ft. in hard ground. The 600 south, from main west, has been advanced 10 ft. on a regular and well defined fissure, with occasional pocket of ledge matter. The 600 quartzite has been extended 23 ft., on a close contact. The 700 north-west, from the 600 winze, has been extended 7 ft., without any change to mention. The 700 south-west, from the 600 winze, has been advanced 9 ft., in fair looking ground for ore. The 700 west from shaft has been drifted 4 ft., in hard limestone. The 700 north, on the line, has been extended 18 ft., in very favourable ground for ore. The 500 north, on line, has been advanced 5 ft., in hard ground. The 830 west has been drifted 6 ft., in the same character of ground. The 800 north-west, on fissure, has been extended 12 ft., in very favourable ground. The 900 west drift has been advanced 16 ft.; the ground in this drift is much more favourable than it has been for some time. The 900 north-west, on fissure, has been extended 13 ft.; the fissure is well defined and regular, with favourable ground on each side. The 900 winze has been advanced 10 ft.; the ground is still broken, with favourable indications for ore. The chambers are all working about the same, with the exception of No. 16, which has greatly improved. In the western end a winze is being sunk in very fine ore; at one place it exposes 5 ft. of black carbonates. In the 700 a drift has been started on the quartzite about 20 ft. above the level, at which place there is 5 ft. of good ore. The furnaces are smelting the usual quantity of ore. All the machinery, both in the mine and smelting works, is in good working order.

BIRDSEYE CREEK.—J. S Goodwin, Dec. 14: We have not had up to this time over 200 in. of water, a great quantity of snow having fallen for several days past; the weather has been moderating, and to-night rain is falling freely —a few days of this and we can resume washing, which I hope and trust will be the beginning of a prosperous season.

Dec. 20: At the Neece and West on the 17th I exploded 659 kegs of powder with success. Since my last writing it has been raining moderately the greater portion of the time. The earth is now well saturated, so that we begin to see the effects in the gradual increase of water in the ditch, which is now running about 400 in. I have everything in readiness for the water. After a short run at Waloupa I shall move the entire pipe, as I shall wash in the direction of where it now lays, as the character of the gravel and the dip of the rock leads me to believe that the pay channel lies in that direction. I am just completing a reservoir at Red Dog, the cost of which will be light; with this we can utilise water heretofore wasted, and with it wash to better advantage.

COLORADO UNITED.—Jan. 21: The manager's accounts from March 31 to Oct. 31 are to hand; they exhibit a net profit of 817,669 for the seven months.

POTOSI (Gold).—Telegram: Produce for first fortnight, 700 to 800 ozs.—3 ozs. per ton. Seven days of 24 hours full work. This was dispatched from the mine on or about Jan. 6, the Christmas holidays intervening.

RUBY AND DUNDERBERG CONSOLIDATED.—Telegram from Eureka received Jan. 19: The week's run from the furnace was £7500, from 174 tons of ore, producing 28 tons of bullion. The shipments of the week were 95 tons.

— Dec. 26: The main shaft is now in very favourable ground for sinking. Progress this week 18 ft.; the total below the 600 ft. level is 108 ft. It is our intention to sink 150 ft. below the 600 ft. level before commencing the next level; the object is to open more ground with the same amount of drifting. At the 600 ft. level progress this week 21 ft.; total from the shaft 287 ft. We are now following the seam of ore reported in my last, which is improving as we advance; it is now about 1 ft. wide of first-class ore, and I believe this is the continuation of the ore body from the north winze on the 500 ft. level. The rise 40 ft., north of the north winze, on the 500 ft. level, has progressed 10 ft.; total 25 ft. above the 500 ft.; the ore continues about 2 ft. wide. The winze at the end of the 500 south has progressed 10 ft.; total 86 ft. below the 500. During the week we passed through 8 ft. of limestone, but have found good ore again in the bottom. In the stopes above the 500 feet level south there is no change to report; there has been little work done on the mine this week. The rise above the 500 ft. level south stope has advanced 8 ft.; total, 28 ft. A prospecting drift has been commenced on a small seam of ore from the stope above and east of the 500; the ore has widened from a few inches to 2 ft. during the week, and looks very favourable for developing into a good ore body. The south drift from the west cross-cut, in the 400 ft. level, has advanced 14 ft. The 300 north has progressed 8 ft.; the ground is harder than usual. The 300 west cross-cut has advanced 10 ft.: total, 380 ft. north drift from the old incline. We have shipped 106 tons of ore, and have 39 men at work, besides three or four tributers. —Bullwhacker: The work of erecting the machinery is progressing as fast as circumstances will permit.

NEW GOLD RUN.—Dec. 28: Mine: We have been washing continually since starting on the 20th, with the exception of time taken to change position of pipe. We average about 22 hours out of the 24. A large amount of rain has fallen, which promises an abundance of water.—Mill: On account of severe storms of late, we could not do much cleaning bedrock and working in the out side, and have not been able to keep mill running continually. I hope soon to be in shape to get more dirt. The bedrock in tunnel prospects well, and we are also finding considerable coarse gold on the outside.

— Jan. 21: The following telegram was received to-day from the superintendent:—We have cleaned up partially after a run of 20 days. The total produce amounts to 83000.

PLACERVILLE.—Telegram from T. Price, received Jan. 17: "500 tons crushed; yield 83630. New vein still favourable."

RINGOLD.—Telegram from T. Price, received Jan. 17: "Crushed 300 tons, yielding 81200; stopped crushing. Vein more favourable in shaft No. 2. Crush again when roads permit hauling."

INDIAN PHŒNIX GOLD.—The directors have received a report from Mr. Grove.—Phœnix Estate: Mr. Grove reports the discovery of four payable reefs in addition to those already known on the Phœnix estate, and the average result of assays from these and two other reefs on this estate is stated at 15 dwts. of gold per ton: ½ ton of rock was taken from each reef, and only samples were assayed that showed no visible gold. Mr. Grove states that he made assays from other samples which gave 4 ozs. of gold per ton. He describes the place in reef No. 1, from which Capt. Giffard took the samples on which he made the very favourable report advised in the circular of Oct. 23 last, as "a perfect quarry of stone." Mr. Grove took a number of pieces from the same place, and, in every case, these gave a fair show of gold. An excellent site has been selected and is being rapidly prepared for the mill, a race laid out (which will give a fall of 150 ft. from the dam to the turbine), thereby securing ample power for the proposed batteries, and connections have been arranged between the levels, tunnels, and the mill. These works have been contracted for, and are in progress of execution.—Rosedell Estate: Mr. Grove has examined a large reef on this estate, which he estimates to be equal to No. 1 on the Phœnix. He considers Rosedell from its commanding position in reference to the other gold mining and coffee properties adjacent, and the good roads which intersect and surround it, to be the best adapted for a central township. It has already a bazaar and post offices and a telegraph station is promised. The head-quarters of the company will probably be situated here.—Lytton Estate: On this property Mr. Grove reports a large outcrop of quartz and a number of ancient workings. He has also discovered another reef at the junction of this estate with the Phœnix. At the time of making his report Mr. Grove had not been able to survey the St. Thomé estate, owing to the necessity of his leaving India for Australia, in accordance with his instructions, to secure certain portions of the machinery wanted, and such a number of skilled miners as will ensure the rapid prosecution of the mining and milling operations. In his absence arrangements have been made to carry on the tunnels, and other works on the selected reefs; to prepare the ground for the mill, to cut the mill race, &c., and the directors hope, in their next circular, to be able to give the shareholders satisfactory information of the further development of the property.

EBERHARDT AND AURORA.—Extracts from Capt. Drake's letter: We cut the spar vein at a point 98 ft. from the tunnel, which is about 12 ft. in thickness, and is pitching to the west at an angle of 56°, and running parallel with the tunnel about 117 ft. distant on the level, or from the bottom of the same; its course is north 1°—30° west. For some 20 ft. before reaching this spar in raise we had some very good quartz and good indications for ore, and I am satisfied that there is pay ore in connection with this spar vein. The course of this vein is nearly the same as that which is in the Consolated ground, and the character of the spar is identical with that of our footwall of the North Aurora Mine, and I am led to believe that it was originally connected with the same, but the top of Treasure Hill has been tilted over to the west. Since passing through the spar vein we have good breaking rock, and we find it more stratified, and pitching to the west, while the rock to the east of vein, and along the line of tunnel from the point we cross the same at the Consolidated ground was very hard with the stratification pitching to the eastward, thus indicating that the axis of the break was at the point of spar vein; the ground through which we are now driving is very much the same as that through which the main incline from the mine was run. If this is ore in paying quantities in Treasure Hill at the depth of Tunnel it must be along the spar vein we have passed through. My plan or idea of prospecting this ground would be by running cross drifts west from tunnel until we reached this spar vein, and then drift along upon it until we become satisfied as to its real value. If there is no ore in connection with the spar vein I would ask why should we find quartz in the limerock? We know there is some ore in the Consolidated ground, and the character of quartz we have just passed through in our upraise is of a much better character than that in the Consolidated ground. It is impossible for anyone to tell the exact locality of the ore, or whether there is ore at all; until it is come upon. My opinion has been so often expressed as to the coming iron ore, and as yet has not been verified, I fear that the company feel very indifferent to the statements of my faith or confidence in their property. I shall adhere to the opinion that there is ore at depth of tunnel, and it can and will be opened out by this the present company or some other company on the near future. Everything about the works is in good running condition, and doing good work.

CANADIAN COPPER.—Captain F. Bennetts, Jan. 6: Acton Mine: We have cleaned up the winze in the bottom of the 10, east of No. 5 shaft, and resumed the sinking. We find that on the hanging wall there is a small branch of black oxide of copper, and that the limerock also contains small branches of copper.—Bolton Mine: Both the 10 north and the 10 south of the north shaft are looking well, as formerly reported. There is no change in the cross-cut to report.—St. Francis Mine: It has been rather difficult to obtain firewood, except at such a rate as was above the ordinary prices. This difficulty has been overcome, and firewood is being brought in; so we trust soon to take up the levels under the adit. As explained in my last, we were driving on the vein in this level; but feeling desirous to test the quality of the vein, I had a blast put in, and have to report that the splice mentioned in my report of Dec. 23 last still continues highly charged with grey and carbonate copper ores, and is getting larger, apparently forming a junction with the main part of the vein. We have not blasted out the main portion of the vein.—Hartford Mine: The vein in the 50, east of No. 7 shaft, is looking well, being from 3 ft. to 4 ft. wide, composed of mundic and copper ore; as this level passes over some rich ore ground seen in the 70, a still further improvement may be expected. The stope in the back of this level is also looking well. We are now also able to avail ourselves of the stope in the bottom of the 10, in which the vein appears to be improving. The stopes in the 60, west of No. 5 shaft, and in the 85, east of No. 7 shaft, are also yielding good ores.

VIRNEBERG COPPER.—R. K. Roskilley, Jan. 18: Hadley Engine Shaft: The driving of the 160 cross-cut east of shaft, during the past fortnight, has been much retarded, in consequence of meeting with a soft basaltic tufa and an increased quantity of water. The end is very troublesome and spare for driving. We hope in the course of a few days to get through this and intersect the lode east of it. The rock is very congenial and mineral-bearing, and, judging from its nature, together with the fine stones of copper pyrites recently met with in the driving, as well as the lode having invariably been found rich in copper near the basalt, we have very good reason to expect that a productive lode will yet be intersected in this cross-cut. The various stopes in the back of the 140 and 120 metre levels are of equal value, and producing a similar quality copper ore as for some time past. The lode in the rise in the back of the 100 metre level north of shaft is much improved for copper ore, worth for that mineral 6l. per fathom, and promising a further improvement. In this level driving south of engine shaft the lode is looking better, and yielding very good dressing work for copper ore. The dressing of ore is being proceeded with as usual, and, considering the severity of the weather, with hard frost, fair progress has been made. Towards another shipment we have 1586 centners already dressed.

— Jan. 20: Telegram: Lode in the 100 end south is 1½ ft. solid copper pyrites.

KAPANGA.—James Thomas, Dec. 4: During the past four weeks ending the 11th inst. the engine shaft has been sunk 2 fms.; depth sunk under the 50, 6 fms. 2 ft. In my last report I remarked the stone in the bottom was improving. I am now very pleased to say a complete change of ground has been met with, which is at present of a most favourable character. The reason of this change is, a strong lode was cut a few days after I last wrote you, in a most congenial country, and of the same description as the gold-bearing strata of the old lode. When driving the cross-cut at the 50 a strong leader or lode was met with, and driven on for some 10 fms., bearing about east and west, dipping north, and I am strongly impressed this is the same lode now cut in the shaft, as it is bearing and underlying exactly the same, as well as its general character and composition. The lode, as now seen, averages 1 ft. wide, and is principally composed of a kindly, soft, crystallised mixture of carbonate of lime, and soft sugary quartz, and highly charged with a rich-looking, fine gold bearing mundic. The indications are precisely the same as the old lode, and it is very porous, letting out a stream of water, which no doubt comes direct from the old lode. In sinking 3 ft. or 4 ft. more we shall get clear below it, when its general character can be better estimated and defined. I have forwarded some samples for assay, as I am persuaded it is auriferous, although I cannot detect visible gold. The shaft has been further timbered and divided, the shifting sollar dropped, and cage guides fixed 3 fms. deeper, and three 9 ft. pumps added to the lift, with new bearers fixed for big screws to hang the sinking lift, so as not to deter our good progress, if possible. In consequence of the important and favourable change of ground, with the pit work and timber work being completed in the best of working order to the present bottom, I hope in future much better progress will be made in sinking. All hands are doing their utmost to expedite the work in every department, and the machinery was never in better order.

ENGLISH-AUSTRALIAN GOLD.—The directors have received the following advices from Australia:—Mr. Mark Pollard writes, Fryerstown, Dec. 9—420 ft. Level: No. 1 rise on the junction of the slide, and lode has been risen 10 ft. this fortnight. Passed through one leader in the western wall about 2 ft. thick; see very good gold in this leader. I shall not work this leader before I put the rise through to the 320 ft. level, which is about 18 ft. more to rise. I am thinking to remove the two men from No. 4 rise that is stoping towards the boundary, and put them in this rise to work two shifts, to get it through as quick as possible; then I shall have good air, and it will be much better to put the timber down than it will be to haul it up from the 420 ft. level. I am still stoping from the back of the level—that is from No. 1 to No. 2 rise—quartz, intersected with slate and sandstone 8 ft. thick; see a little gold quartz; poor ground, very hard. I have two men stoping western side of the 180 ft. level; leaders of quartz with bars of slate and sandstone, 20 ft. from east to west, and 10 ft. thick, which is payable.—150 ft. Level: I have removed the men that were rising from the back of the 320 ft. level to rise in the centre of the stopes at this level to prospect the western ground, and to get mullock to fill up the stopes with. In rising here I have met with a block of quartz 4 ft. thick; have not seen any gold in them. I am also rising 30 ft. further north. I have quartz also in this rise. This stope is looking very well for quartz, but it requires a lot of labour to fill up the ground. I have taken on three men and one young fellow during this month. —70 ft. Level: I have not made much progress with this level this fortnight; it is very difficult and tedious work to go through the broken timber. I have crushed 407 tons of stone; result, 61 ozs. 6 dwts, retorted gold. I am also preparing to pump out the water from the western shaft; there is about 100 ft. of water in the shaft.

SCOTTISH AUSTRALIAN.—The directors have advices from Sydney, dated Sept 8. The sales of coal from the Lambton Colliery during the month of November amounted to 13,871 tons.

THE ALMADA AND TIRITO CONSOLIDATED SILVER MINING COMPANY (LIMITED).

MINA GRANDE.—Capt. N. C. Morcom, Oct. 14: The 12 fm. level, driving north, has been productive of stones of black ore, but not sufficient to pay the expense of excavation. We shall suspend the driving until we take down the west side of the level, near the present end, in order to ascertain whether a better part exists there or otherwise. The lode in the sink below the 17 is still yielding a little ore. The felspar is still prejudicial to the lode. The stopes in the back of the 12 are without any change worthy of notice, still yielding abundance of metal. We are pushing on this point with all possible vigour.

SAN JUAN.—A great deal of metal has been extracted from this point since we commenced operations. Recently it has been less productive, and in a rather unsafe state, by reason of being in contact with very extensive old workings. Last night an immense crush took place, filling the place with debris from above, and breaking the timber in the tunnel for several yards in length. We shall at once seek to regain the position we have lost.

MINA GRANDE.—Oct. 28: The lode in the winze sinking below the 12 has 1 ft. of solid black ore. The felspar continues to follow the lode in depth. I fear there will be no change for the better until a new channel of ground be met with. While the lode continues to produce metal as it is at present, we should consider our position to be very hopeful, as the lode may open out again at any moment. The stope in the back of the 12 is as productive as usual; the present width of the lode is 25 feet. From this point we raise the greatest portion of our black ore. There are strong indications of the lode making another part to the west of the excavation in the big black ore stope below tunnel. Should this prove to be the case it will add very considerably to the reserves.

SAN JUAN.—We have spilled through the breakdown in the tunnel, and are again extracting ore as usual.

MINA GRANDE.—Nov. 11: The large black ore stope in the back of the 12 is still in a very productive state; there are signs of its becoming less productive in the north end. The ore still holds its own on the west side of the stope, and thus leads us to hope that it may continue to make to the tunnel. It is most important that it should do so, as this is our main supply, and any falling off in the ore body here would be very serious. The operations carried on below the 12 in the winze and south, &c., have been confined to sinking and driving where the ore makes. The lode has again become poor in the sink, the felspar as usual taking the place of the metal. We have just started to drive south of the present sink, which is 50 ft. below the 12. The lode contains some good stones of ore in the present end. Notwithstanding, I fear the large body of felspar has rendered the lode valueless in depth, and also I fear to the north and south of the present workings to a considerable extent.

SAN JUAN.—Stoping is being carried on in the back of the level, in connection with the old workings, which are very extensive. It is very probable the old workers have left but little for us to take away, unless it be some of the sides, which may be of a lower grade.

MINA GRANDE.—Dec. 8: The lode in the bottom of the 17 is not very productive at present. The stope in the back of the 12 continues its usual productiveness. The lode is still very wide, and yields a large quantity of ore. It is very satisfactory to state that we have proved beyond a doubt that the course of ore in the western side of the lode will reach Tunnel level, and probably many feet above it. We were rather doubtful for some time whether the big black ore stope below tunnel had not taken away the heart of the bunch of ore. We are now in a position to say that such is not the case. This we have ascertained by driving a cross-cut west of tunnel level, and directly over the main stope, where we found the lode large and strong, and of the same nature as seen below. In the cross-cut west, driving through the lode, the western wall is met with, and the men put to drive north towards San Juan old workings.

SAN JUAN.—Almost all the ore value is taken away from this point. We have long been in connection with the old workings, which have given us a great deal of trouble. All the ore to the south is extracted. The north part is poor, and will not pay for any further operations.

LA VIRGEN.—Oct. 14: The stopes both in the back of tunnel level and the 10 are without change.

Oct. 28: The green ore stope in the back of tunnel has become too poor for further working. The black ore part is still turning out a fair quantity of metal. The stope in back of the 10 is yielding—as it has for some time—a fair quantity of good black ore.

Nov. 11: The stope in the back of tunnel level has undergone no change; the lode is still productive of good black ore. The stope in back of the 10 has improved a little, yielding some fine lumps of good black metal. The stope will most probably make to or near tunnel level.

LA VIRGEN.—Dec. 8: The stope in the back of tunnel level yields black ore in a rather limited quantity. The lode is smaller than formerly, and the length less than it was. The stope in the back of the 10 fm. level is still productive of good black ore, but not quite as much as for some time past.

FIRST LODE.—Oct. 14: The stope in the back of tunnel level is still in an orey lode. The sink in the bottom of the level has met with some fine balls of ore.

Oct. 28: There has been no improvement taken place in the back of tunnel nor below in the winze since last reported. The tribute department is poor, and but little ore being broken.

Nov. 11: The stope in the back of tunnel having become too poor to pay the expense of working is suspended. A little green metal is still being met with in the bottom of the tunnel level north and south of the winze sunk on the course of the lode. This lode being of such an uncertain character we rely but little on its durability.

FIRST LODE.—Dec. 8: The ore continues to make to the west of the winze sunk from tunnel level. This is the largest branch of ore we have known the lode to make since it has been worked on. We have not much faith in its long continuance, knowing as we do the character of the lode.

MINA GRANDE.—J. H. Clemes, Nov. 13: Cross-cut under Main Stope in Tunnel: Our recent drawing showed in blue lines the position and direction. We spilled through the attle of the big stope, and met the horse which separates the two lodes. This was orey, and during the drifting this week four cars of good black ore were sent out. We now think we are through the horse, and in the 12 or west vein the face of the cross-cut shows a remunerative lode (I strongly object to the free use of the adjectives fair, remunerative, &c., but am in a hurry, I will send you figures next week), and we think that the west branch has not belied the unmistakable signs it shows in the stopes of living to the tunnel level as an independent vein, without in any way splicing or merging into the main lode. A few more days will throw much light on this important point.

SAN JUAN.—This is being steadily stoped. The ores although above water line are only partially oxidised, and have to be treated as refractory. The connection of this place with the Combination shaft is not lost sight of, but only in abeyance. We have had to spend money freely in the bottom, and to stop doing so at present would be a suicidal policy. We have reserves enough on hand to give us time to make a new find in bottom providing that ore exists there.

Nov. 22:—WORKINGS NEAR AND ABOVE SAN JUAN.—The cross-cut sketched on the recent drawing and referred to in my official letter, No. 197 (Nov. 13, *ante*), has been continued. We had to spill through the attle of the old stope (20 ft. to 24 ft.), and have since gone 8 ft. through mixed horse and lode matter, with varying quantities of ore, the total from eastern side being 32 ft. The end carried for some days past has shown about 4½ tons of ore per cubic fathom. The ores are leaching and smelting, and roughly cleaned assay 35 ozs. 28 ft. from the eastern side we intersected a 9 in. stringer carrying export ores with leaching ores. We shall shortly explore this western vein at a point some 40 ft. above tunnel level. At the 17 winze the drift going south-east on ore has somewhat fallen off in value.

Nov. 25: The above cross-cut is still being continued in a strong coarse lode; the present face shows ore that may be estimated approximately at 4 tons per cubic fathom. The ores are mostly of the leaching class and of ordinary milling grade. Price per foot 812, the contractor furnishing his own materials, the mine removing the ore and waste. I now regard the existence of the 12, or Western vein, up to tunnel level as a proved fact. At an old ore pass or mill in the main stope hands were put yesterday to spill west, at a height of 40 ft. above tunnel level. This is to search for the Western lode at said height. This cross-cut is situated about 75 ft. south of the one in tunnel.

DRIFT GOING SOUTH FROM 17 WINZE.—A change has taken place in the ground, which is much more favourable for spending, the ore nearly fills the back of the drift but tapers towards the bottom, not a very healthy sign. As the ground is much more favourable we hope to progress much faster, and throw light on this vital point.

MINA GRANDE.—Nov. 29: The new cross-cut was run the whole of last week, and on Saturday the end was improved. There was more ore in sight, being about 5 tons per cubic fathom, and the gangue was entirely lode matter—*i.e.*, quartz with ferruginous stains. The ores are leaching and smelting.

SOUTH-EAST DRIFT FROM 17 WINZE.—The end has much fallen off in value; the total of the spots of ore would not be more than 6 in. The back of the drift is in solid ore. The indications are favourable, and we do not know if these point to another ore bunch ahead, or to the one we have just traversed. The drift continues.

CROSS-CUT ABOVE TUNNEL.—After clearing our way west of the mill before mentioned we found a cross-cut evidently the work of the ancient miners: 2 or 3 ft. back from the end we found a narrow vein of quartz from which we broke a good stone or two of argentiferous galena. This vein is very pinched. The cross-cut has every appearance of having not been carried far enough west, and this must be ascertained by survey. There are stones in the end of what looks like the west country rock; these, however, are sometimes found in the horse that occurs between the two veins. Not to be saddled with two much deadwork at once, explorations at this point are deferred until the cross-cut at tunnel level be done with. Capt. Morcom and I will give our serious attention to the views you express about our western ground at Mina Grande (I fully coincide with them), and advise you at once.

DRIFT FROM 16 WINZE.—Dec. 4: Very little ore can now be seen in the end, and a great deal of the kindly looking lode matter has been replaced by felspar.

CROSS-CUT IN TUNNEL.—4 1-10th ft. were driven during the week, making 40 1-10th ft. from eastern side of tunnel level. For the last two days the end has shown somewhat less ore, the pay ore being about 1½ ft. The cross-cut shows all the characteristics of the stope underneath; had it been put out from a point a few feet north of the one chosen it would probably have shown much more ore. From the old stope we have now gone through 16 to 18 ft. of western vein. The ground laid bare by this cross-cut adds very largely to our ore reserves.

TELEGRAMS RECEIVED FROM MR. J. H. CLEMES.—Dec. 11: Reserves largely increased.——Dec. 23 and Jan. 4: Profit for November, 83750. I have remitted you ores, 81100.

[For remainder of Foreign Mines see this day's Supplement.]

TIN HILL.—SPECIAL REPORT.

Jan. 20.—Since starting work at the end of last November, we have cleared the foundations of smithy, carpenters' shop, and saw house, and erected the same in a substantial manner, and in suitable positions. Foundation for engine-house, stack, and loadings have been taken out. We have found it necessary to go to the unusual depth of 12 ft. in order to get a solid foundation, the surface having been riddled to that depth by ancient tinners, who must have found uncommonly rich deposits of alluvial tin washed from the backs of the surrounding lodes. The erection of the engine-house is being vigorously proceeded with under a time contract. The sites for the stamps and dressing floors have been decided on, and contracts are being concluded for the completion of the same within the shortest time. The reservoir, which is of large capacity, is now capable of being used to the greatest advantage by the introduction of a lobby to take the water from the lowest level. A road has been made to the quarry, which we opened to supply building-stone for the engine-house, &c. A second short piece of road has also been constructed to the quarry lode, which is 18 ft. wide, 6 ft. of which is worth 3¼ cwt. of tin to the ton of lode stuff, and from which we are getting tinstone against the erection of the stamps.—Underground Work: We made a survey of the mine in November, and re-opened several of the old men's pits on the numerous lodes which form a star of intersections on the centry of the property. The lodes we found well defined, and rich in tin at the parts opened. The great caunter shaft was eventually fixed upon as the most suitable to command the whole of the lodes near the intersections. Great caunter shaft is now enlarged, secured to the proper size for pumping and winding. It is sunk to a depth of 5 fms., but owing to the recent wet weather operations have been suspended until the water subsides. Great Plexy shaft is down 5 fms., but being under the same conditions as the great caunter shaft, further sinkages delayed till the pumping-engine is started. We have put men to cross-cut at a depth of 4 fms. to the great caunter lode, which will be cut in a day or two. The lode is 6 ft. wide, and, judging by the old men's workings, is estimated to be worth 2 cwts. of tin to the ton of lode stuff. In the course of a few days men will commence stoping this lode at about 5s. per ton, and we hope to have a large quantity of tin stuff at surface by the time the stamps are ready. We send by next goods train a fine specimen of tin rock from this lode, 1 cwt. in weight and containing 25 per cent. of pure tin. East shaft, near the old engine-house, is cleared and timbered to the 12 fm. level. We have also cleared the level on the course of a productive lode coming from the direction of Polgooth, and supposed to be one of that series. A large quantity of tin stuff is being raised from the numerous branches of tin running almost parallel with this lode. A few fathoms north-east on this level a cross-cut has been driven, and has intersected another lode 8 ft. wide, bearing in the same direction as the last, on which we have sunk a shaft 7 fms. deep, opening up a large run of tin ground, which is now being stoped at a good profit. The east engine-shaft will drain these lodes to a depth of 25 fms., and will open up an extensive run of tin ground very easy of working. In reference to the mine generally, the lodes are opening up in a remarkable manner. It is now two months since men were first set on to clear up the old excavations, and from the highly satisfactory nature of the lodes laid open, tinstone can be raised in large quantities as soon as the pumping machinery is in operation. In the meantime stopes are set in the rich parts of the lodes at the shallow levels, which can be worked at once, in order that a good supply of tin stuff shall be at surface at the starting of the stamps. We do not know any tin mining property in Cornwall that is so devoid of the speculative element, and presenting such sure prospects of early and continuous dividends.—J. S. JAMES, S. TRETHEWEY.

INDIAN OLD MINES.—There is no abatement in the interest which these properties continue to excite, and the area of investors in them is largely on the increase. This is scarcely to be wondered at in view of the highly favourable reports which continue to be received from the properties in India. The South Indian, Indian Glenrock, Devala Moyar, and Indian Phœnix shares are well worth purchasing at current quotations.—*Madras Mail.*

WELSH COMPANIES IN 1880.—Comparing January, 1880, with present prices, there has been a very marked improvement in the principal Welsh companies. Taff Vale stock has advanced from 211 to 255; Rhymney, 173 to 190; Ebbw Vale Iron, 8¼ to 13; Rhymney Iron, 23 to 36; Newport Abercarne Coal, 6 to 7½; National Bank of Wales, 6 to 7½; West of England Bank, 8 to 10; Alexandria Dock, 7 to 12½; and Nantyglo and Blaina, 24 to 41.

HOLLOWAY'S PILLS—The stomach and its troubles cause more discomfort, and bring more unhappiness, than is commonly supposed. The thousand ills that settle there may be prevented or dislodged by the judicious use of these purifying Pills, which act as a sure, gentle, anti-acid aperient, without annoying the nerves of the most susceptible or irritating the most delicate organisation. Holloway's Pills will bestow comfort and confer relief on every headachy, dyspeptic, and sickly sufferer, whose tortures make him a burden to himself and a bugbear to his friends. These Pills have long been the popular remedy for a weak stomach, for a disordered liver, or a paralysed digestion, which yield without difficulty to their regulating, purifying, and tonic qualities.

METALLURGY AND MINING IN RUSSIA, AND THE NEW METAL TARIFF.—No. I.

Russia of the present day presents a marked contrast to the Russia of former times. It is becoming one of the greatest newspaper reading countries in Europe. In the old days of what one might term extreme paternal Government the Press was limited to the enumeration of persons recently decorated, and decrees of state. All this has now changed. At present there is no subject relating to the economy of the Empire which is not discussed in the Russian public journals—the exploring of the mineral riches of the country, establishing of iron and steel works, the construction of machinery, railways, &c., are favorite themes with all the daily papers and most of the monthly magazines. During the last decade societies have sprung up both in the capitals and in the interior for promoting the arts and sciences, whose energies have already had an appreciable effect in leveloping the resources of the country. Among these the Russian Technical Society and the Society for promoting Russian Commerce and Industry are doing good service. We find from the reports of the proceedings of the former that as many as 85 meetings are held yearly; there are frequent lectures and technical discussions. With the view of extending as much as possible theoretical and practical knowledge the society publishes a special journal—"The Technical Magazine," which has several hundred subscribers. With the same object the society publishes also translations of foreign works on practical mechanics. Several technical schools for workmen and children have been opened under their auspices. The activity of the society has been particularly conspicuous in the investigation of the raw materials consumed in factories and works, manufactured articles, and especially the *modus operandi* adopted in Russia, several special committees having been formed with the above object, among which may be mentioned an enquiry into the best means for testing steel tyres, and of the material of which they are manufactured. The investigation of the mineral riches on the borders of the Governments of Ekaterinoslay and Khevson, and the salt beds of the Sloviano-Bakhmond basin, in the South of Russia. But the most important labour undertaken by the society in this category was the enquiry into the state of iron manufacture and machinery construction in Russia, with the view of determining the best means for promoting industries. With this view were called together, at a general meeting, all the principal ironmasters and machinery constructors of Russia, from whose deliberations we gain an insight into the state of business in Russia, as well as the protectionist views held by these representatives. These deliberations, and the resolutions carried by that assembly, have served as the basis for the new duties upon iron and machinery, which will come into force on Jan. 13, 1881. The committee recently charged with the revision of the existing tariff of 1868, proposed to increase the duty on pig-iron from 5 copecs per pood (5d. per cwt.) to 10 and 15 copecs per pood (10d. and 15d. per cwt.) This was, however, overruled. To accept such a proposal would have been clearly a blunder, for Russia requires yearly at least 40,000,000 poods of wrought-iron of various descriptions, and for that purpose they want the raw material. It is a well known fact that Russia herself scarcely furnishes half the iron she requires. The smelting of iron ore being still conducted by the ancient method, they are unable to supply the demand, so the duty on pig-iron remains as heretofore, 5 copecs per pood (5d. per cwt.) There is another change effected by the new tariff regulations—the total prohibition of the importation, duty free, of pig and wrought iron by machinery constructors, which have done so much in promoting that business in Russia. The duty upon iron rails has been raised from 20 copecs per pood (1s. 8d. per cwt.) to 45 copecs per pood (3s. 9d. per cwt.), besides prohibiting the free importation of rails by railway companies—the duty on steel rails, 45 copecs per pood (3s. 9d. per cwt.) has been retained. All this will, no doubt, exercise some considerable influence on the railway business in Russia, and on the trade with this country. It should be borne in mind that Russia will soon consume some 20,000,000 poods of rails yearly, calculating for repairs and new lines. The duty on wrought iron, such as bars, hoops, tyres, &c., remains the same, 35 copecs per pood (2s. 11d. per cwt.), as also on sheets and plates, 50 copecs per pood (4s. 2d. per cwt.) The duty on unmanufactured steel has been reduced from 80 copecs per pood (6s. 7d. per cwt.) to 35 copecs per pood (2s. 11d. per cwt.), and manufactured steel from 1 rouble, 35 copecs, and 450 copecs per pood (11s. 2d. and 28s. 11d. per cwt. to 80 copecs 1 rouble, and 2 roubles per pood (6s. 7d., 8s. 3d., and 10s. 6d. per cwt.) The duty on rough castings, 50 copecs per pood (4s. 2d. per cwt.) remains without alteration, while there is an increase on cast-iron articles partly finished, from 80 copecs (6s. 7d. per cwt.) to 1 rouble per pood (8s. 3d. per cwt.) The manufacture of rails in Russia, although carried on to a considerable extent, is far from being able to supply the full demand, and it is scarcely probable that the production will increase to any marked extent until new rolling mills are started, adapted for the manufacture of iron, with mineral fuel instead of charcoal, as is mainly practised at present. Great things are expected from the Donets coal-basin in the south of Russia, where immense coal deposits are met with, as well as large supplies of iron ore of good quality. The following are the principal establishments in Russia occupied in the manufacture of rails:—The Nijehagile works in the Ural, belonging to Mr. Demidoff; they turn out iron rails of a superior kind exceedingly hard, having the qualities of steel, at the price of 1 rouble 60 copecs per pood (13s. 3d. per cwt.), delivered at Nijni-Novgorod; the Poutiloff Company, Limited, near St. Petersburgh, do an extensive business in re-rolling old rails and welding puddled steel heads on to them—this is, in fact, a speciality of this establishment, which claims to have been the first to introduce this method of treating old rails. Large orders for new rails are likewise executed by the firm for Government account, besides miscellaneous articles required for the Russian railways. The Grande Societé of Russian railways likewise recalls its old rails to some considerable extent. The New Russian Company in the south of the country, which is under the management of Mr. Hughes, late of the Thames Ironworks Company, turns out a goodish quantity of new rails for Government supply, as do also the rolling mills of Mr. Pashokhoff, situated in the same locality. And, lastly, there is the Vicksounsky English Company at Vieksa, in Government of Nijni-Novgorod, which also furnishes a respectable quantity of rails. The programme of the meeting referred to above embraces also a variety of other questions in detail in connection with the mining metallurgical industries, such as the conditions for developing the iron trade in the Urals, and in the Donets coal basin in the Vistula country, and in the Olonets districts. Many of the resolutions carried are of some considerable practical importance. For instance, those referring to the interecession for the aid of the Government in working the coal beds of the Urals, the effecting of fresh geognostic and geological researches in that part of the empire, the abrogation of the mining duty, the reduction of the cost of carriage of raw materials on the mineral traffic line in the Urals now being constructed, the sale of Government works that are found superfluous or useless to the latter into private hands, the promotion of the construction of iron smelting establishments on the waste Government lands, the promoting the manufacture of steel by the Bessemer process, in order to prevent the high quality Ural cast-iron being converted into inferior wrought-iron, the measures for introducing in the Ural a rational economy in the management of the forests which are being destroyed wholesale. Resolutions of the same kind, taking into consideration local conditions, were carried with regard to other localities abounding in mineral wealth.

What strikes one at Russian industrial exhibitions is the immense mineral wealth of Russia. When one sees it set forth in maps and tables of the latest date, and illustrated by specimens, this mineral wealth is astonishing. The country has produced a good deal of iron and gold, and been famed for it, but its coal fields are only now beginning to be worked in earnest, and many of the riches have been lying idle for want of capital and labour to work them. It seems a pity that Russia just now should hamper herself with still greater tariff restrictions, which makes foreign machinery so dear to miners, while their own productions are frequently worthless. Of course there are many who will reply, and this is the constant argument of Russian protectionists, that America, in a somewhat similar position, finds profit in protection, or at least grows rich in spite of it. But the manufacturing resources of America are such that a protective tariff changes the condition of trade rather than hinders it, point blank, whilst in Russia the commencement of mining is often hindered by the cost of foreign machinery and appliances, and it will be more so after the introduction of the new duties. They are as follows:—On coal trucks, 75 roubles, or 10*l.* per axle, increased from 10*l.* per truck. All kinds of machinery and apparatus used in mining, such as stationery and portable engines, winding machines, pumping engines, 80 copecs per pood (6s. 7d. per cwt.) increased from 30 copecs per pood (2s. 6d. per cwt.) There is a reduction, however, on wire rope from 2 roubles 50 copecs (20s. 8d. per cwt.) to 1 rouble 50 copecs (12s. 4½d. per cwt.)

At a time some five years ago, when the credit of Russia had not yet lost its popularity abroad, and in anticipation of fresh loans to be raised in England new railways were projected, embracing a network of 6500 versts, which, together with the other lines that had been proposed for construction, would have amounted in all to about 8000 versts. The construction of this extensive network was divided into four terms. In the first term were included 2600 versts, which were to embrace the great Siberian line, extending to the west and east of the Urals, and the Donets mineral traffic lines, of which there were to be seven. The latter undertaking was started by a company under the title of the Donets Coal Traffic Railway Company, whose object was to facilitate the exploring of the rich coal deposits in the Donets basin. A glance at the map of Southern Russia and the basin of the river Donets, an affluent of the Don, which is a little inferior in magnitude to the main river, and the disposition of the coal and iron ore bearing localities, will be sufficient to convince anyone of the enormous economic advantages that are likely to accrue to the mining and metallurgic industries of that port of Russia from the above company's scheme. The company was to undertake the construction and working of a line from the Zveroo station to the projected station of Krinitch, on the Kursk-Kharkof-Azof Railway, with branches extending from the main line: 1, to the station of Nikitofka on the Kursk-Kharkof-Azof line; 2, to the north Donets river *via* the Lugan Ironworks, with a port or landing place on that stream; 3, from this branch in the direction of the town of Slaviansk, on the Kursk-Kharkof-Azof Railway, with branches to Lissitchousk and Bakhmunt. The statues of the company contained, among other provisions, a clause, according to which the company is precluded from working the coal and iron mines on their own account, or from establishing works, or from dealing in the production of such establishments. This clause was inserted with the object of purchasing the interests of the ironworks already established in those districts, like Hughe's and Pashokhoff's, and those of future ironmasters, and in the interest of the local coal and iron mine proprietors. Of these lines, owing to a great extent to the interference of the late war, only a small portion has been completed, but will be proceeded with as soon as the necessary capital is forthcoming.

[*To be concluded in next week's Journal.*]

MINING PLANT AT THE BRUSSELS EXHIBITION—No. I.

Although far from ranking among the most important collieries of Belgium, the Gosson-Lagasse Mine at Montegné-lez-Liége is that one of all others which has kept pace with the march of improvement, both on the surface and underground, as demonstrated at the Exhibition by geological plans and sections of its workings, drawings of its surface works, winding and pumping-engines, mechanical traction, &c. As the installations at this colliery represent the progress made in Belgium mining during the last ten years, a short description may appropriately serve as preface to the present article.

The Gosson-Lagasse royalty occupies an area of 317 hectares (783 acres), and has a daily output of 1000 tons. Among the appliances which in Belgium were first adopted at this colliery may be mentioned the Goffint valve gear for direct-acting pumping-engines, the Körting aspirator for the ventilation of workings in progress, direct traction elevators, the Gramme electric light for surface works, the rotary pumping-engine, the Rittinger pumps; the barometric condenser, the Armstrong accumulator for feeding steam-boilers, Beer's three-cylinder winding-engine, Roots' multitubular boilers, and Harzé's ventilator with vertical oxis. There are two centres of working in the concession, and seven pits altogether, the principal centre being connected by a branch with the Liége and Limburg Railway, and the remainder of the coal raised being conveyed by wagons worked by endless chain to the Meuse and North Belgian Railway. The winding is effected in five pits by a pair of vertical engines, with Meyer expansion gear, a pair of horizontal engines, with ditto, a three-cylinder engine on the Beer system, with expansion variable by the governor. Two pits serve for pumping. In one of them there are two direct-acting pumping-engines, one with Goffint valve gear and Letoret condenser, and iron pump trees in both cases. Ventilation takes place at three pits by two Fabry fans of Colson arrangement in one, a 9-metre Guibal fan in another, and Harzé fan of 8 metres diameter, with vertical axis in another. Besides this, two Körting's aspirators are ready to act in case of a break down. The coal of the various seams has three distinct characters, one being suitable for gos making, another for the production of coke, and the third for industrial purposes. The company pay more than 2000*l.* per annum in pensions to old miners and relief to those who meet with accidents.

Mining plant, Class 35, was divided into several sections, B being restricted to rock-boring and excavating appliances. Under this head Mr. J. Chaudron, mining engineer, Brussels, exhibited inside the Porte des Nerviens a complete set of the apparatus for boring shafts, invented by the late Mr. Kind, and successfully applied by the exhibitor to sinking shafts in water-bearing strata in connection with his system of tubbing, specimens of which were shown in the machinery department by the Société Marcinelle et Couillet. This system derives additional interest from the fact that it is applied to a shaft at Cannock Chase Colliery, though at present in abeyance owing to an accident to the tubbing, and also to two shafts at the Whitburn New Winning, recently visited by the Newcastle Institute of Mining and Mechanical Engineers. Instead of, as usual, pumping the water out it is allowed to remain in the shaft, and rather assists than retards the boring, which is accomplished by mechanical means. First the small "trépan," or drill, weighing 12 tons, and armed at the bottom with wedge-shaped steel teeth, attached by rods to one end of a beam, is raised by the engine and allowed to fall by its own weight. Being slightly turned on its axis at each stroke, it bores a hole 6 ft. 6 in. in diameter, and the debris are removed from time to time by a cylindrical receptacle, with valves in the bottom opening upwards, which is alternately let down into the hole, and raised to the surface. The large "trépan," weighing 20 tons, follows and enlarges the shaft to 15 ft. 6 in. in diameter, the debris falling into the advance hole, whence they are readily removed as before. When the water-bearing strata have been passed through, and a solid foundation reached, a ring of cast-iron tubbing with internal flanges, having a temporary bottom attached, is lowered into the shaft so as to float, and is sunk to nearly a level with the surface by allowing sufficient water to flow inside. A second ring is bolted to the first, and the tubbing sunk deeper, and then a third, a fourth, and so on until the bottom is reached. Previous to this, however, a ring of smaller diameter than the tubbing has been allowed to rest on the bottom, with the space between it and the sides of the pit filled with moss, so that when the lowest ring of tubbing comes down between the inner ring and the sides of the pit it compresses the moss and forms a perfectly tight joint, after the manner of a stuffing box. The false bottom which is attached to the lowest ring but one is now removed, and the interior pumped dry, when further sinking can be performed in the ordinary manner. The space between the tubbing and the rock is also filled in with concrete, making a perfectly tight and solid job.

Altogether 45 shafts have been sunk by this method, 32 are completed, leaving 13 in course of execution. Besides the three shafts in England mentioned above six have been sunk in Westphalia and five in Saxony, where Mr. Chaudron has now begun a shaft at the Eisleben Copper Mines. The adoption of this system has permitted the resumption of work in the Moselle Collieries, where at least 1,000,000*l.* had been thrown away in trying to sink shafts by the old method. Since one of the companies—the Société de Saint Avold et l'Hôpital—successfully applied the Kind and Chaudron system to their Nos. 1 and 2 pits, it has been adopted for all sinkings in this district. In France 19 shafts altogether have been undertaken. In the northern district 16 pits are finished, and two are in progress. At Dax, in the department of Les Landes, a shaft is also being sunk at a salt mine; 12 shafts have been put down on this system in Belgium, including two at Mauraga, which were pronounced unsinkable by the ordinary method, and two at Ciply, where the works before the Kind and Chaudron system was adopted remained in abeyance on account of the great inrush of water. Four shafts are now being sunk—two at the Bracquegnies Colliery, and two on the Ghlin concession, belonging to the Société du Nord du Flénu. The two former, one of which is nearly completed, will be the most important as regards the diameter and depth of tubbing of all that have yet been taken in hand. The Ghlin pits will, however, constitute the principal work of sinking on this system, inasmuch as they will have passed through 300 metres (164 fms.) of water-bearing and loose strata, then the whole series of chalk and flint strata, some more loose strata, and finally the millstone grit and sand which directly overlie the coal measures. These pits present such great difficulties that mining engineers are of opinion that if they are successfully put down there is no sinking that may not be accomplished by this system.

In connection with their 100-horse power pumping-engine, the Société John Cockerill put up at the Exhibition a certain length of iron tubbing on the new plan carried out at their Cécile Pit. This pit is sunk to a depth of 523 metres (285 fms.), with a diameter of 4½ metres (14 ft. 9 in.) The first 26 metres were lined with masonry in the ordinary way for keeping up the surface and the foundations of the buildings and engines. As there was no solid stratum in the sides of the pit stout oak timber was first laid for the masonry to rest upon, and from this was suspended by means of rods the first frame, a ring of channel iron. The four segments of the ring are jointed by cast-iron fish plates fitting into the groove of the channel iron, and secured by vertical pins. The succeeding rings are attached to the first by means of eight uprights, also of channel iron, flanged at each end and secured by bolts. As all the uprights are of exactly the same length, it is sufficient to level the first ring, when all the rest must come plumb. The work is completed by 2-in. timber staves driven outside the rings. A great saving is effected by the new system, as compared with a lining of masonry, in time, labour, and cost of material. The Cécile Pit, which was tubbed with iron frames, was sunk in 18 months, while the Marie Pit, lined with masonry, required three times that period for the same depth. The total cost of the former was 88,367 fr. for labour, and 212,254 fr. for material, forming a total of 300,621 fr. (12,025*l.*) against the Marie Pit, which cost 397,600 fr., leaving a balance of about 97,000 fr. (3880*l.*) in favour of the new system. Other collieries, notably the Marihaye, Horloz, and Concorde, have now begun to adopt this method. For supporting the roof and sides of horizontal workings the Cockerill Company bend waster railway bars, with the flange outwards, into the form of a horse shoe, specimens of which were exhibited. The tram rails are laid directly on the bottom portions, which serve as sleepers, and are fixed by means of rings and keys. This system has been in operation for ten years. The wood and iron systems in the same gallery or working were compared after the experience of seven years. While the timber lining had to be renewed every year in both cases, the iron framing was perfectly good, but the timber had been renewed every year. Moreover, the tram rails on the iron portion only required setting right once a year, compared with thrice in the same period for the timber portion. The first cost of the iron support was 44 fr. per metre run, against 24 fr. for the timbering, but the maintenance of the former was only 8 fr. per metre run per annum, against 28 fr. for the latter. It is not too much to say that, in the matter of tubbing shafts and supporting the galleries of mines, the Cockerill Company have made a distinct step in advance.

[*To be concluded in next week's Journal.*]

HYDRAULIC MINING IN EL DORADO COUNTY—No. III.

By ALEX. DEL MAR, M.E., U.S. Monetary Commission, &c.

The third opening is comparatively small. Apparently it has not been worked for a long time. The bank is about 20 ft. high in the middle; gravel, sandy and poor; bed rock, soft; dump, good. Surface of hill prospected down to clay stratum. Numerous "nigger-heads," which some miners regard as a favourable sign. There is a shaft and tunnel, both of which are caved in, and thus inaccessible.

Continuing along the edge of Tennessee Hill until its eastern extremity is reached numerous small hydraulic openings are arrived at, whose general appearance is similar to the one last described. They have all been thoroughly prospected on the surface by sluicing, at the face by piping, and into the hill by means of shafts, tunnels, and drifts. That they have all been abandoned for years, and are now in a dilapidated condition, is a tolerably correct indication that they did not and probably will not pay. This indication is confirmed by the results of panning done under my supervision, and presently to be mentioned.

The two tunnels shown on the map in the east side of Tennessee Hill are caved. The more southern one has a car-track (tramway), very much dilapidated. The face of the bank shows clay; no gravel in sight. It is evident that the vicinity has been thoroughly worked. Besides the tunnels shown on the map there are numerous small ones not shown. These are all caved. This end of the mountain slopes into a country very little lower than the base of the mountain. The dump is, therefore, bad—less than 3 per cent., and the operations at this point have been chiefly surface sluicing, and drifting into the side of the hill or mountain.

On the south side of Tennessee Hill the fall or slope is even less than on the east, and is, therefore, too gradual to permit of hydraulic operations. The ground on this side is low, and appears to be pretty well worked out. The Fort Jim Tunnel shown on the map is dilapidated. I selected and helped to pack to Weaver Creek several bags of fairly-selected gravel from the various openings in Tennessee Hill, particularly the third, fourth, and fifth openings. These were taken from as close to the bed-rock as I could get. I stood by, and saw them panned. Out of six heaped pans, one pan showed two colours, one pan one colour, and the remainder nothing. From these prospects, as well as other circumstances, I conclude that except, perhaps, at its north and west sections Tennessee Hill will not pay to work. Even if we confine our attention to these sections I am not sufficienty assured of their richness to determine whether, in view of the cost of fitting up, and ihe cost of water, powder, wages, and other current expenses, it would pay to work them.

In 1876 the "mining expert" previously alluded to estimated the cost of fitting up Tennessee Hill at $14,900. Mr. Crawford recently furnished me with an estimate for one opening at $4500, or the two openings at the north-west at $7500. In these calculations he makes no allowance for necessary improvement of sluice tunnels, which in the previous calculations are very moderately estimated at $6750.

MISSOURI HILL.—This claim consists of 28 acres, of which about one-half is said to be mining ground. The average depth from surface to bed-rock may be about 40 feet. The surface of the hill was first piped off, and then a cut commenced at its eastern base, which cut has been carried back as far as the dumping grade on that side permitted. This cut has left exposed the face of a gravel bank several hundred feet in length, and some 30 ft. in height. The gravel is similar to that on Tennessee Hill, but contains fewer sandy and other barren strata. Several pans were taken from the face under my instructions, and washed in my presence, yielding one or more colours in every instance. It is claimed to contain, on the average, 50 c. to the cubic yard—a claim that appears to be fairly established, at least so far as the gravel in sight is concerned. Prudence would, however, suggest an ample allowance for barren strata; so that, taking the entire claim together, a much lower average would, perhaps, be nearer the mark. There is one prospecting shaft through the higher portion of the hill that gives a depth of 47 ft. to bed-rock; but there were no means of descending this shaft, nor of determining the character of the strata through which it passed. Judging from the dump outside the shaft, which dump is, however old and rainwashed, the shaft must have passed for the most part through gravel. Two other prospecting shafts seen on the hill had caved and filled up.

Water is brought to this hill by a ditch, two miles in length, and

onveying about 250 inches. Pressure from this level down to bedock, about 100 feet. At the time of my visit the ditch was dry, and no work was being done on the claim. This ditch would have to be enlarged to a capacity of 800 in.—a work that would cost almost as much as a new ditch. The water company could then supply about 800 in. during the winter months, and 250 to 300 in. during the summer. The cost of water would be 6¼ c. per inch (5-in. pressure) during 10 hours of daytime.

The dump on this side of the hill has run out of grade, and nothing more can be done with it. The only practicable way of piping this deposit is to attack it on the west side. On this side the hill falls more abruptly, and a dump can be made by a moderate amount of cutting through the bed-rock that would enable the deposit to be piped into a subjacent ravine (dry). This dump would have a grade of about 6 per cent., which, considering the favourable character of the gravel, would be ample. This estimate is based on levels taken from the bottom of the 47 ft. shaft to the bottom of the ravine, at a point where the tailings would be swept by natural forces into a flowing stream below. A bed-rock tunnel has been commenced at this point, but no work is being done on it at present.

DRY GULCH.—This claim consists of 160 acres, of which 95 are said to be mining ground. No work is being done on the claim at present. A number of shafts have been sunk through various portions of the hill, but none are in a condition to be examined. They appear to be many years old. Some are caved, and filled with rubbish; others are filled with water, and one of the latter is used as a well. The rest are unprovided with windlasses or other means of descent. It is obvious from the great size of the hydraulic opening at the east end, and from the long tunnel and extensive shafts at the west end, that the auriferous portions of this hill as yet unworked are very extensive.

Owing to the condition of the shafts I cannot pretend to determine the average depth of the mining ground. The bank at the open cut east is fully 75 ft. high, and, as at this point the bed-rock pitches into the hill in a north-westerly direction, the deposit is deeper beyond than at the face of the cut. How far this increase of depth continues I had no means of determining with certainty. Judging from the contour of the hill and the slope of Dry Gulch ravine I conclude that the gravel increases in depth to the northern limits of the claim.

A shaft on top of the east bank went, as I was informed, to bedrock at 85 ft., and showed that the latter fell away or sloped downward as it receded from the face. This fact proved fatal to the continuation of the work as an hydraulic operation. I found this shaft to be timbered with light lagging, and in a dilapidated condition. Another shaft west of the bounding-house, shown on the map, went 128 ft. to bed-rock, and confirmed the evidence of the previously named shaft. This 128 ft. shaft was near the centre of the claim. A shaft north-west of the house went 58 ft. to bed-rock, the latter pitching toward the house. The gravel found at the bottom of this shaft is said to have panned $3·83 to the cubic yard. I presume the quantity found of this quality was exceedingly small. The other shafts were 74 and 48 ft. deep respectively, and deserve no special mention, as I found them, like the rest, to be inaccessible.

The following strata appear on the face at the opening at the east end in the order named, commencing at the top:—Alluvium, gravel, clay and sand, gravel (a thick stratum), white clay, blue gravel (a thick stratum), gravel, sand, bed-rock, Something more than one-half the entire depth of the bank was gravel. This gravel was round and smooth; but contained many large angular boulders, that must have rendered it difficult to deal with the mass. This surmise receives confirmation from the appearance of the paving blocks in the sluice. Such blocks commonly last for two years; here they were worn down in a single run, and worn down very roughly and unevenly. I was assured that the entire ground yielded on the average 45 c. to the cubic yard—a statement which I have no reason to doubt, and yet which I was afforded no means of verifying. This gravel contains no fine gold; it is all found attached to the quartz pebbles. Hence, nothwithstanding the rough and deep falls and grinding it got from the face, through the flumes, rock tunnels, riffles, &c., much of it must have been carried away with the débris, and lost on the ravine which forms the dump. In other words, this is very difficult gravel for hydraulic work.

TREATMENT OF MIXED ORES.

Some improvements in the treatment of ores have recently been specified by Mr. F. J. King, of Bishopsgate Avenue, who a few years since obtained the Silver Medal of the Royal Polytechnic Society of Cornwall, and the special *Mining Journal* Prize for his Magnetic Machine and his paper on the Magnetic Separation of Ores. At that time the invention was only applied to the separation of blende from spathose iron, but since that date Mr. King has been experimenting on the separation of the tin ores of Cornwall from the pyrites, with a view to saving the pyrites and the copper which generally accompanies it. In his investigations on samples of burnt ore sent from four different Cornish mines, he found that the pyrites which is now washed away in buddling the burnt ore to clean the tin contained an average of 6·6 per cent. of copper, besides silver to value in some cases, the highest gave 15 per cent. of copper and the lowest 2·6. In several instances the copper contained in the pyrites was of as much value as the tin with which it was mixed. The fine state of division in which the stamped tin ore is necessarily treated made the cleaning of the pyrites by the magnetic machine from the tin a more difficult operation than worked on coarser ores, the tin being so valuable none of it must be carried away by the magnetic attraction of the pyrites. This difficulty appears to be now removed, as in the machine now specfied the tin and the pyrites are in passing over a magnetic surface on their passage to the magnetic wheel separated into distinct layers before arriving at the separating wheel; by this means the pyrites, which by the present burning-houses is already brought to a magnetic condition, can be easily separated, the tin cleaned from the iron, the coppor pyrites being delivered on one side of the machine, and the iron and copper pyrites (free from tin) on the other side. By this process the tin is freed from the iron without the loss of tin which buddling involves, a loss which the works down the Red River below the mines sufficiently prove, and the iron with its associated copper is saved. The money value of the copper washed away in cleaning its tin ore at one of the mines whence a sample and statistics of quantity was obtained is, at 12s. per unit, nearly 2000*l.* per annum.

The second specification describes the process Mr. King adopts for extracting the copper from the pyrites when thus separated, in order to obtain the copper in the form of oxide, equal to 80 per cent. metallic copper. without the heavy costs involved in the ordinary methods of smelting or chloridising such ores. The process is equally adapted for the separation of iron and copper pyrites from blende, and rendering such ores, which thus mixed are unsaleable to the smelters, of the full value for each metal when thus divided.

ANTIFRICTION JOURNAL BEARINGS.—To provide a journal bearing of great durability, but little subject to wear, and by the use of which a great economy of oil is obtained, Messrs. CIRIO and MARCA, of Turin, propose a construction by which the acting surfaces of the trunnions of the shaft and of the constituent parts of the journal are held in exclusively rolling contact with each other, all actual friction or motion of one surface in rubbing contact over another surface being completely avoided. They introduce between the surface of the trunnions and the bearing surface of the journal box a sufficient number of cylinders of hard metal, preferably steel, parallel to the shaft, so that the rotation of the shaft in one direction causes these cylinders, each one of which is along its entire length in contact with the shaft, as well as with the internal surface of the journal box, to revolve in the opposite direction around its axis upon the said internal surface of the journal box, producing thereby a compound motion of these cylinders; first, a revolution around their axes against the revolution of the shaft, and second, a bodily displacement in a circular line in the direction of the rotation of the shaft. They prefer to adopt such dimensions that these cylinders shall be not only in contact with the shaft and the journal surface, but that each one of these cylinders shall be also in contact with the two adjacent ones, so as to insure in a positive manner that the shaft is always held exactly concentric to the internal surface journal. If necessary or desired the cylinders may be held against longitudinal displacement by flanches formed on the journal projecting inward toward the axis, and in every case the parts should be constructed very carefully, so that the diameter of the cylindrical hollow of the journal box be exactly equal to the diameter of the trunnion, plus twice the diameter of one of the cylinders, it being understood that the cylinders themselves be all of equal diameters.

Lectures on Practical Mining in Germany.

CLAUSTHAL MINING SCHOOL NOTES—No. CLXVIII.*

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GENERAL THEORY OF PISTON VENTILATORS.

Tournaire's ventilator is similar in general design to Coombe's. It consists of a flat circular disc, keyed on a shaft, and carrying the vanes on each side. The exterior diameter to the outside of the vanes is 34 ins., and the inner diameter to the inner ends of the vanes is 27 ins. The vanes are curved to the form of a logarithmetic spiral, so that they form a constant angle of 70° with the radius drawn to any part of the vane. The vanes strike the air on the convex side, and are narrower at the outer end than the inner, as in the case of Lloyd's blower. The ventilator is enclosed on both sides by circular or cylindrical casings, which are about 16 in. in diameter, except near the revolving disc, when they rapidly enlarge, forming very flat conical discs, which enclose the fan. These cylinders have each a large boss or core-piece, attached by three radial ribs to the side of the cylinder. The core pieces are so shaped as to guide the air gradually outwards towards the vanes, and they are bored out through the centre for the insertion of steel sockets, in which the spindle carrying the revolving disc rotates. Between these ribs sheet iron guides (about 30 in number) are placed radially, so as to distribute the air equally all round the inner circumference of the vanes. The cylindrical casings are provided with inlet openings cast on to the casings, so as to form part of the bed of the ventilator. The air is thus delivered to the ventilator on both sides, and the solid revolving disc prevents the opposite currents meeting each other. It will also be evident that one side of the ventilator will work equally well when the other side is removed. The axle is furnished with a pulley and rotated by means of belting from any suitable motor; the end of the axle being supported in a socket attached to one of the cylindrical casings by means of a cast-iron support.

The object aimed at in the design of the ventilator with convex vanes (vanes which strike the wind on their convex side) seems to be to allow the air to escape in a radial direction, and therefore with as little change in direction and velocity as possible. Moreover the inner ends of the vanes are sometimes designed to catch the air without any shock. The rule for finding the angle which the inner ends of the vanes make with a tangent to the inner circumference is that "the tangent of this angle is equal to radial velocity divided by the circumferential velocity of the inner end of the vane." When this rule is observed the particles of air as they enter the space do so without receiving any shock or blow from the vane, and those which enter close against the vane glide along the surface; the change in direction and velocity of the air particles is then produced gradually, and without shock. The radial velocity of the air is found by dividing the amount of ventilation per second by the area of the preriphery of the inner circumference of the vanes. If the same rule be adopted for finding the angle which the outer end of the vein should make, with a tangent to the outer circumference of the veins, that—"the tangent of the angle is equal to the radial velocity in passing over the outer circumference, divided by the circumferential velocity of the outer ends of the vanes," then an angle is obtained some degrees greater than Zero; and, consequently, if the outer ends of the vanes are made tangential to the outer circumference of the vanes a partial vaccum or rarefying of the air will take place near the end of the vanes on their convex side, and in this portion eddies will be created, and even a back current towards the centre of the fan. Again, when the vanes are bent backwards too sharply the air in issuing in a radial direction will tend to crowd against the concave side, and thus leave the convex side forming eddies and back currents, to which the humming noise of many fans is due. Lloyd's ventilator is designed to remedy this defect. It possesses six curved vanes, which are convex on the side with which they strike the air. The vanes are trapezoidal in shape, tapering gradually towards the outer ends, so as to diminish the section of the outlet near the outer circumferance. The vanes are enclosed on both sides by conical sheet-iron discs, which revolve with the vanes. The air finds access to the centre of the fan on both sides through circular openings formed in the casing. The casing, which is circular, and encloses the fan concentrically, is somewhat larger than the latter, and is formed in four separate pieces, which are bolted together. A delivery opening is formed, as usual, in the casing. The fan is driven by belting passing round a small pulley on the axle of the fan. A Lloyd's fan, 3 ft. dsameter, and making 1400 revolutions per minute, is said to be able to cause a blast of 16 ins. water guage pressure through a 7 ins. tuyer. It has not, however, been demonstrated that the narrowing of the outlet at the outer circumference of the vanes presents the formation of the above eddies, though it probably lessens them. This fan has, however, the disadvantage that the velocity of exit from the fan is increased, and being surrounded by a circular casing larger than the fan, eddies are caused in the annular space between the vanes and casing, with a corresponding loss of pressure. Another proposal to remedy this defect is that of Lambert. Lambert's ventilar possesses radial vanes; the space between two vanes is partially closed in by a cylindrical casing, which covers the space between two vanes on the side in the direction of which motion takes place. This proposal seems liable to the objection that the section of outlet being diminished the velocity will be correspondingly increased. The result of an experiment is stated by Von Hauer to give 20 per cent. less of useful work for Lambert's than for a Guibal's ventilator.

Somewhat peculiar is the form of ventilator invented by Chagot, and exhibited in the Paris Exhibition of 1855. It consists of a vertical axle, carrying at the upper end an inverted cone, made of sheet-iron, and at the lower end a very narrow cylinder. A truncated cone is attached to this latter cylinder, so as to be placed concentrically with regard to the first cone. The cylinder runs within a fixed cylinder placed at the mouth of the shaft. Three straight vanes are placed in an inclined direction between the two cones. The ventilator is put in rotation by means of belting.

Naysmith's ventilator, of which two or three examples were erected in South Wales. is an ordinary straight vaned fan, or rather consists of a circular disc with straight vanes attached on either side. The vanes are curved off towards the disc at the centre. The ventilator at the Abercarne Colliery is 13½ ft. in diameter, and possesses eight vanes, 3 ft. by 3½ ft., attached to a circular disc 6 ft. in diameter. The side supports for the axle of the fan are formed hollow, and have circular openings on the sides next the fan. These supports are bolted to a hollow bed plate, which is connected with the mouth of the shaft. The air is drawn up through the hollow supports to the centre of the fan, which has no casing, but delivers direct into the atmosphere. A play of 3 in. is allowed between the edges of the vanes and the supports. The fan axle is 10 ft. long, and driven direct by a steam-engine of 13-horse power, and is placed about 6 ft. sideways from the shaft. The natural ventilation of the colliery amounted to 22,560 cubic feet per minute. At 60 revolutions per minute the fan increased the amount to 42,000 cubic feet per minute, and at 80 revolutions per minute the amount was increased to 52,500 cubic feet per minute.

Letoret's ventilator is a fan with four to six straight vanes, which are placed in an inclined position with regard to the radius. This ventilator at the St. Victorie Colliery, near Liege, consists of four rectangular vanes of sheet-iron (1-12th inch thick), rivetted to bars of iron, which are hinged at the inner end to bars rigidly attached to the axle of the ventilator. To these rigid bars flat pieces of iron, semicircuiar in shape, are attached, having a series of holes, through which pins can be inserted, for the purpose of fixing the hinged vanes to any desired inclination to the radius. The inclination most favourable for any given velocity of the ventilator is first found by trial. This angle is varied between 105 and 135 degrees. Ponson doubts whether the inclination of the vanes to the radius has any advantage whatever, and consequently in many of the newer examples of Letoret's ventilator the vanes are riveted to fixed arms bent at a given angle. The ventilator is placed between two walled culverts, which are arched in at the top, and lead from the top of the upcast shaft. From 1 to 2 ins. play is allowed between the sides of the vanes and the walls of the culvert, and the ventilator delivers freely into the atmosphere. The air enters the ventilator through circular openings left in the inner walls of the culverts in the neighbourhood of the axis on both sides of the ventilator; the latter is often provided with a centre diaphragm, to prevent the two currents of air striking each other. The ventilators are generally driven by belting from steam engines of about 12-horse power. The ventilators at the Bayement and Grande Veine Collieries were of the following dimensions respectively:—Radius of circle described by outer edge of vanes, 4·22 ft. and 4·55 ft.; length of vanes, 3·74 ft. and 3·9 ft.; depth of vanes, 2·6 ft. and 3·25 ft.; ratio of the diameter of circle described by the outer edges of the vanes to diameter of the central openings for the entrance of the air to the ventilator, 3·75 ft. to 1 and 4 to 1. This ratio is of considerable importance, for if the opening is too small the resistance to admission is increased; and, on the other hand, if the opening is too large a double current is created in the neighbourhood of the axial openings, one close to the axis towards the ventilator and another near the circumference of the opening from the ventilator to the culvert.

The following results were obtained with the ventilator at the Bayemont Colliery:—Number of revolutions per minute, 266; water guage depression, 2 ins.; the volume of air exhausted per minute, 11,550 cubic feet; useful effect of ventilator, 3·82-horse power; power given out by engine, 16·16-horse power; ratio of useful effect to power employed, 0·236. With 230 revolutions per minute a water guage depression of 1·3 in., and 26,000 cubic feet of air exhausted per minute, the useful effect is 5·6-horse power, and the power employed 10·7-horse power, the ratio of the useful effect to the power employed being 0·52 to 1. In the latter case, however, the ventilator exhausted direct from the air. The above details are furnished by M. Jochams. Burat gives the following particulars respecting M, Letoret's ventilators erected at the Agrappe and Escouffiaux Collieries respectively: Diameter of circle described by the outer edges of the vanes, 10 ft. and 9·3 ft.; length of vanes, 3 ft. and 3·9 ft.; diameter of axial openings for admission of air, 5·2 ft. and 4·55 ft.; water guage depression, 1·17 in. and 1·95 in.; the volume of air exhausted per minute, 35,200 cubic feet and 13,650 cubic feet; useful effect, 40 and 44 per cent. Lottner doubts the accuracy of the per centage of usefal effect, and gives as the average ratio of useful effect to power employed of Letoret's ventilator 23 to 26 per cent.

GUIBAL'S VENTILATOR.—This ventilator may be considered as an improved design and construction of Letoret's ventilator. The following is a general description of an 8-vaned Guibal's ventilator. Two 8-armed castings, or bosses, are fixed on the axle, one near each end. To the end of these arms eight long bars of angle iron are attached, so that each bar is fixed to two adjoining arms of the boss. To these angle irons the wooden blades are attached to form the vanes. The size of ventilators which have been constructed varies from 13 ft. to 50 ft. exterior diameter, and from 5 ft. to 12 ft. wide. With eight vanes, the vanes are inclined at an angle of 67½ degrees to the circumference of the circle described by the inner ends of the vanes. The vanes are bent at about one-third their length from the outer end of the vane, so as to terminate at the outer end radially to the circumference of the circle described by the outer ends of the vanes. The smaller sizes are driven by belting, and the larger sizes direct by a steam engine, the crank of which is fixed on to the axle of the ventilator. The fan is enclosed within a brick casing, more lately the casing has been made of sheet iron. The casing is open for about one-fourth of the circumference, where it is connected with a short vertical chimney, the section of which rapidly increases towards the upper part. The opening from the casing into the chimney can be regulated at will with a sliding flexible shutter. The casing prevents any back currents between the vanes, though the greatest advantage derived from it is the diminishing of the velocity of exit.

MACHINE MINING IN CLEVELAND.—The Cleveland miners were among the first to derive the advantage of the improvement of the iron trade at the end of 1879, and they have worked regularly during the past 12 months. The output of ironstone will, perhaps, scarcely reach the maximum quantity attained in 1876, when more than 6½ millions of tons were won; but in 1880 the quantity will not fall far short of that production. The miners are working in most cases 12 days a fortnight, 10 or 11 days being the exception. During 1879 the output of ironstone was only about 4¾ millions of tons. Drilling machines have been in some cases employed for several years past, and are now coming more into general use. Each machine is capable of winning something like 50 tons per day, as against 5 tons per day won by a miner working by hand. There are now 22 of those machines in operation in Cleveland. The ordinary miners have averaged about 4s. 6d. per day net wages over the past 12 months. In 1872 and 1873 the ruling wage was about 7s. per day. There are now employed in the Cleveland mines between 8000 and 9000 men.

TREATING ORES AND MINERALS.—When a mineral such as copper pyrites or iron pyrites carrying copper is roasted, so as to dispel all or nearly all the sulphur, the copper is in a state in which it is soluble in ammonia; if the whole is not rendered soluble it may be made so by further roasting with or without salt, or by the addition of salt or salt and water and exposure to the air for some time. Mr. F. J. KING, of Bishopsgate Avenue, then places such mineral products in a vessel, such for example as a cylindrical steam boiler mounted on rollers, and introduces dilute ammona, and he rotates the vessel slowly until the minerals soluble in ammonia are dissolved, he then allows the contents of the vessel to remain for the solid matters to settle, or he clears by filtration; he then conducts the ammonia liquor into an air-tight vessel, which he connects with an air-pump or exhausting apparatus, by which means he removes the atmospheric pressure and causes the ammonia gas to be disengaged from the liquor, and the copper is thereby precipitated. If any silver is present in solution it may be first precipitated by copper, while the copper may in turn be precipitated in the metallic form by zinc, which can be separated as white oxide of zinc by the removal of the ammonia gas in the manner above described. The ammonia gas is passed from the pump into water, forming fresh ammonia liquor for further solutions. He prefers to use a steam jacket round the vessel from which the ammonia gas is pumped, as the removal of the whole of the ammonia gas is facilitated by heat. After the amomnia liquor has been drawn off from the mineral products treated water is added, and the vessel is revolved until all the ammonia and dissolved mineral has been washed out and drawn off, when the mineral residue is cleared out and another charge inserted. This process is applicable to the ores of zinc and silver, and all such minerals as are soluble in ammonia.

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* Being Notes on a Course of Lectures on Mining, delivered by Herr Bergrath Dr. VON GRODDECK, Director of the Royal Bergakademie, Clausthal, The Harz North Germany.

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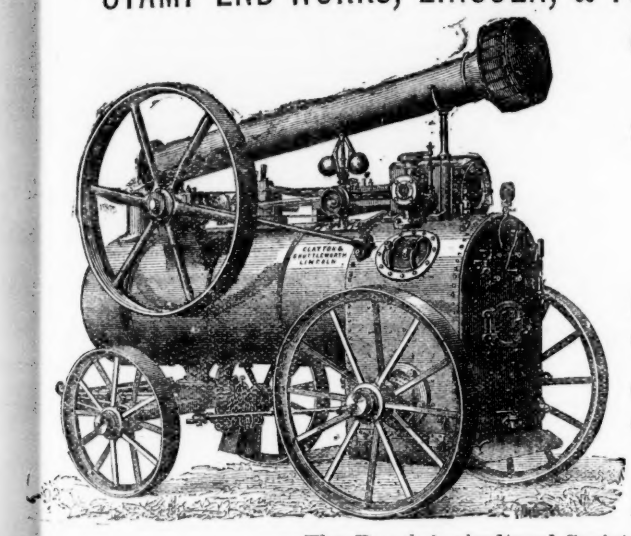

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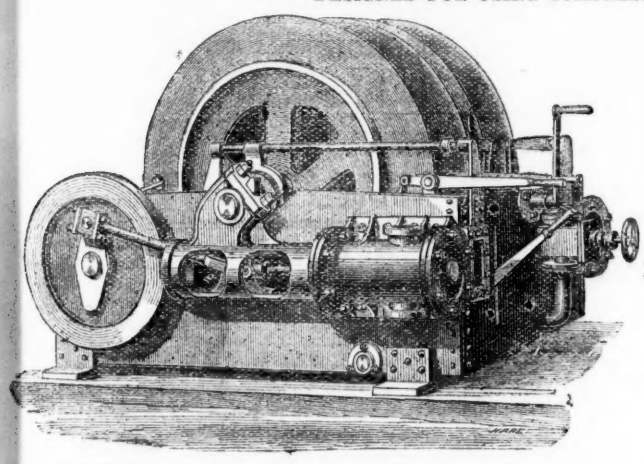

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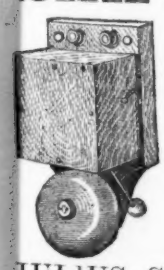

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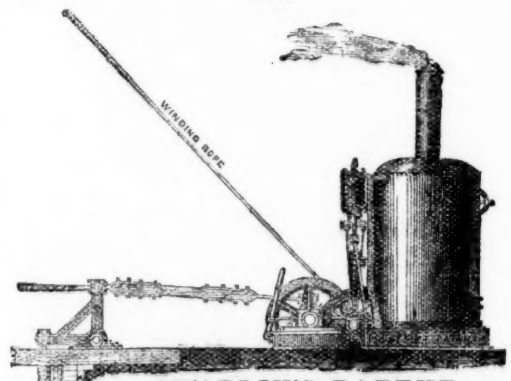

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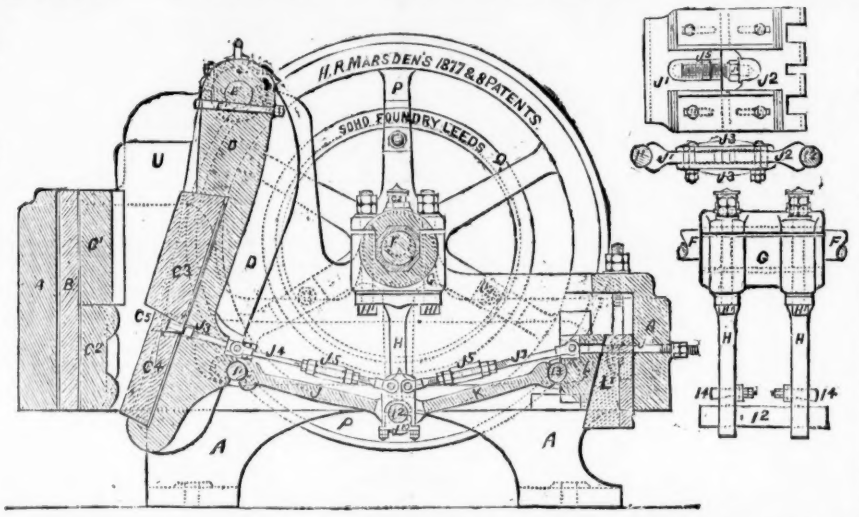

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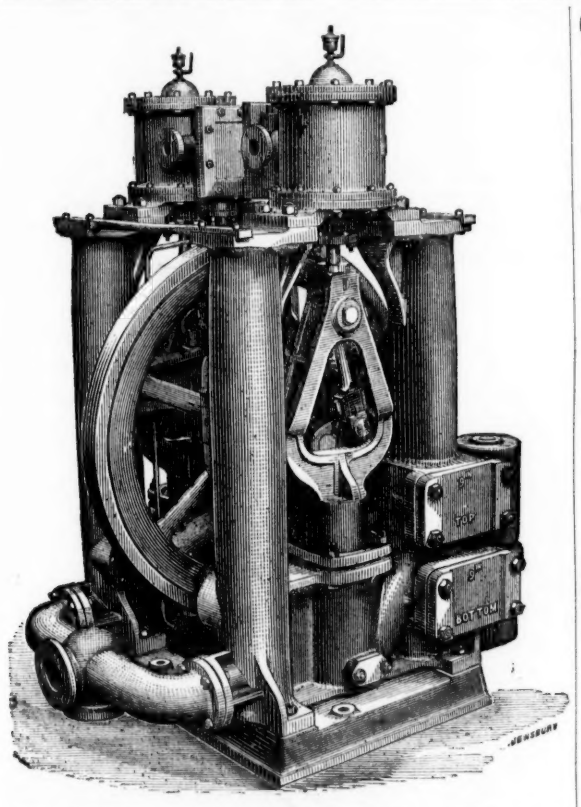

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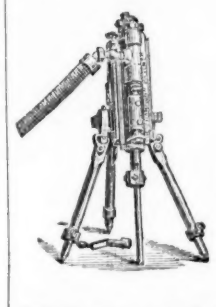

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